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OPERATIVE SURGERY

IN THE

CALCUTTA MEDICAL COLLEGE HOSPITAL:

STATISTICS, CASES, AND COMMENTS.

BY

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PREFACE

THE Statistics of Surgical Operations are peculiarly liable to fallacies. As usually presented, they are compilations either of cases or of collections of cases, published in periodicals or in the form of monographs. They are then the outcome of work by different men, under different circumstances, and according to different methods. The single cases are most frequently the more striking or successful in the practice of the reporter, who does not consider it necessary to report the more commonplace or unfortunate. Successes are apt to be readily chronicled and failures left unrecorded. Statistics based on data of this kind are simply untrue as representatives of the results of the particular operation whose instances are tabulated. Again, the operator, who pays special attention to one class of cases, has perhaps acquired special dexterity in their management; or, guided by his earlier experiences, he has practised some principle of selection which is not employed by others. There is such a thing, too, as a run of luck, a succession of fortunate cases, and these may be published alone, the preceding and succeeding less favourable results being wittingly, or unwittingly, suppressed.

But even when all cases occurring in an institution or practice within a certain period are tabulated, the figures require, for the development of their full significance, to be supported and explained by some details of the cases themselves, and the circumstances surrounding them, in order to display their true meaning and admit of their being used for purposes of comparison. For these reasons it appears desirable that surgical statistics should be exhibited in such a way as to remove all risk of being misunderstood through partiality and incompleteness; and the best method of doing so is to present a complete picture of the whole of one man's practice in the same place and circumstances during a certain period, and to supplement the figures with sufficient descriptive details of the cases themselves, and of all the influences bearing upon them for good or for evil, so that a thorough and correct understanding may be imparted of what the figures really mean. It is not necessary for this purpose to relate every case in great detail. The more important and interesting may require full narration, while the more ordinary and trivial may be dismissed with bare mention or very curt record.

I have endeavoured in this work to realize these views by tabulating in an orderly manner all the cases of surgical operation which have come under my treatment during five years' service as Surgeon to the Calcutta Medical College Hospital, and by compiling short notes of each case from the detailed histories of them kept up in the wards.

A record of this sort serves another useful purpose—namely, to show what numbers and proportions of the

different species and classes of cases occur in hospital practice in a particular place and time. The surgical characters of the place and period are thus clearly displayed, and the pathological proclivities of the population may by this means be estimated.

I have drawn upon my general experience in practice for the purpose of setting forth this aspect of the compilation more fully, and appended some statistics of other provinces and hospitals of the Bengal Presidency for comparison and contrast.

A third and very instructive use of this sort of publication is to offer data for estimating the influence of improvements in general or special sanitation, in the performance of operations and the after-treatment of those operated upon, which occur, or ought to occur, as knowledge and skill are gained by observation, experience, and invention. Sir Joseph Fayrer, who for many years occupied the same position in the Medical College Hospital which I have now the honour to fill, has recorded in two most instructive volumes, entitled "Clinical Surgery in India," and "Clinical and Pathological Observations in India," published respectively in the years 1866 and 1873, the results of his clinical observation and experience in Calcutta; and it is thus possible to institute a comparison, which I shall endeavour as far as possible to do, between two periods of surgical practice in the Medical College Hospital, separated by an interval of some ten years.

The statistics and cases in this volume have been drawn up by my own hand; but I gratefully acknowledge my indebtedness to my house surgeons, Baboos Nitai Churn

Haldar, L.M.S., Gopal Chunder Chatterjee, M.B., Devendra Nath Dey, M.B., and Amrito Lall Das, L.M.S., for ready and efficient aid in the management and reporting of the cases included in this record. A few of the operations were performed in the beginning of 1879 by my predecessor, Dr. W. J. Palmer, and are so distinguished.

There are certain subjects, to which special attention has been devoted, which appear to me to merit special notice—namely, the operations for Scrotal Elephantiasis (Chap. X.), for the radical cure of Hernia (Chap. XIV.), and for Anæsthetic Leprosy by nerve splitting and stretching (Chap. XVIII.); but throughout the book sundry clinical incidents and experiences are recorded, which will, I venture to hope, be found of interest and use.

K. McLEOD.

LONDON, *March* 1885.

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PLATE I.

Sketch of the parts concerned in an operation for the cure of Hernia, in which death took place eight days after operation.
(See Case IX. 2. b. i. page 190.)

FIG. 1.—View of the internal ring from the interior of the peritoneal cavity.

FIG. 2.—Dissection of the inguinal canal, showing the stump of the sac embedded in lymph.

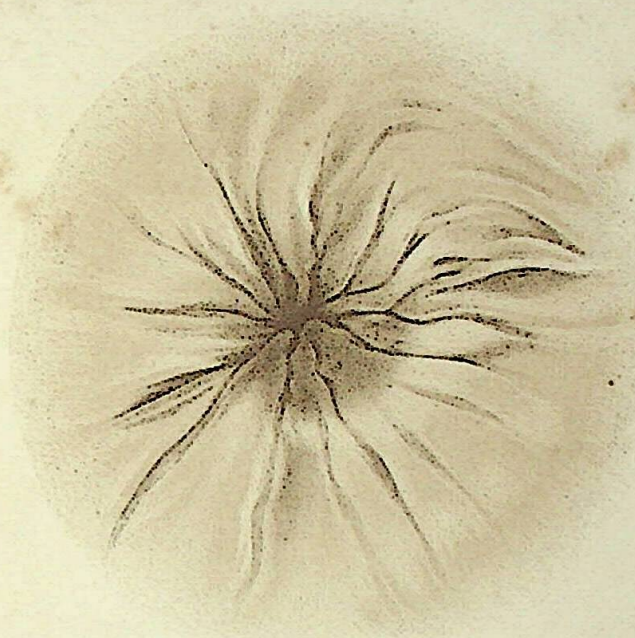


Fig. 1.



Fig. 2.

PLATE II.

Sketch of the parts concerned in an operation for the cure of
Hernia, in which death took place twelve days after operation.
(See Case VI. B. 1. b. cxxiii. page 123).

FIG. 1.—View of the internal ring from within.

FIG. 2.—Dissection of the inguinal canal, showing the stump of
the sac and cord.



Fig. 1



Fig. 2.

PLATE III.

Sketch of the parts concerned in an operation for the cure of Hernia, in which death took place seven and a half months after the operation. (*See Case J.X. 2. b. ix. page 193.*)

FIG. 1.—View of the internal ring from the interior of the peritoneal cavity.

FIG. 2.—View from within after the reflection of the peritoneum and dissection of the vessels and spermatic cord. The dissection is carefully described in Appendix B (page 326).

N.B.—The parts were removed by detaching the os pubis at the symphysis, and sawing through the rami of the pubes and ischium. The drawing was made after the preparation had been laid on a flat surface.



Fig. 1.



Fig. 2.

PLATE IV.

Portrait of a patient whose larynx had been removed 146 days previously. (*See Case VI. A. 2.f. i., page 91*).

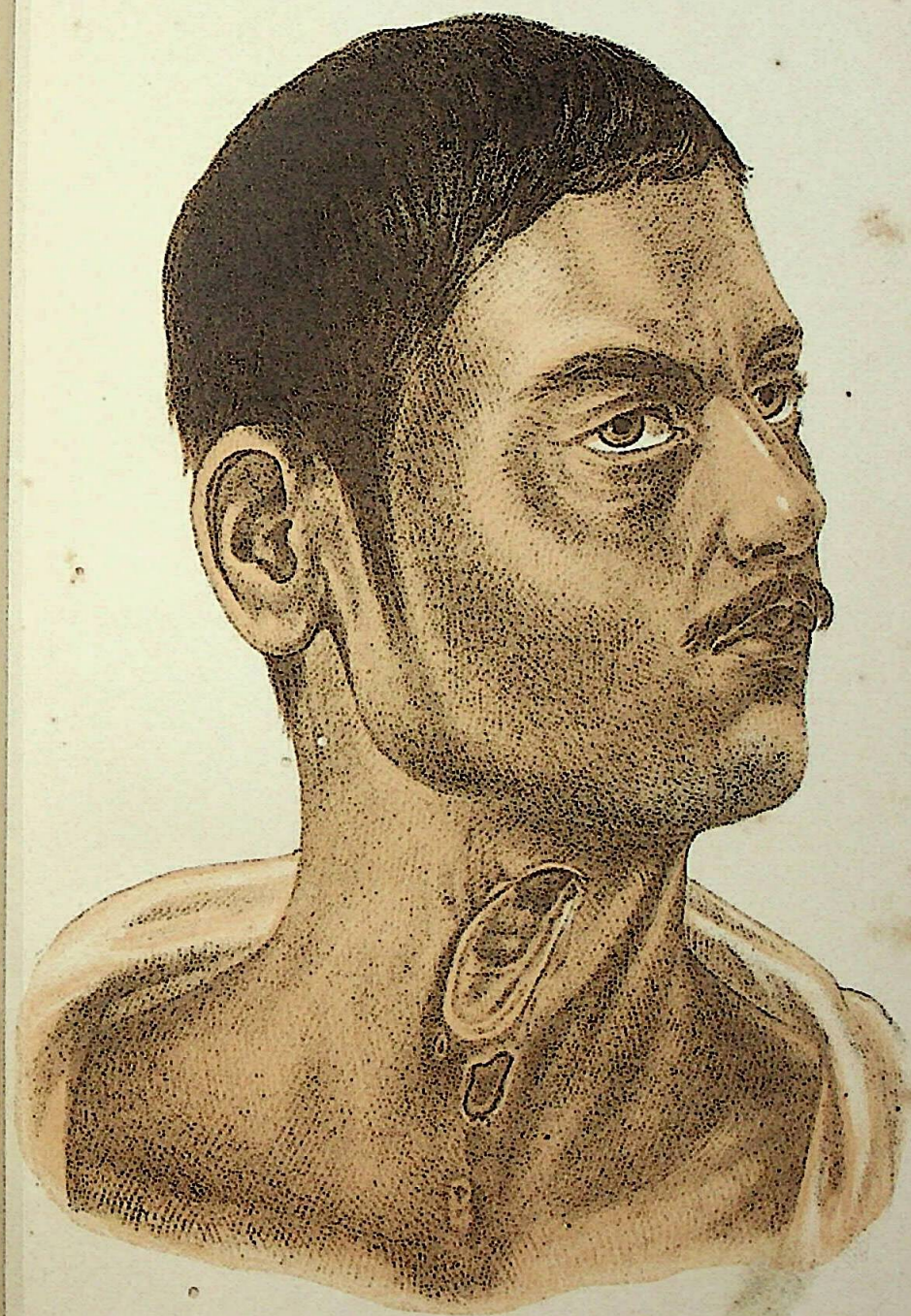


PLATE V.

Sketch of the parts removed in the case whose portrait is shown in Plate IV.

FIG. 1.—External aspect.

FIG. 2.—Interior of the larynx after division of the cricoid cartilage.

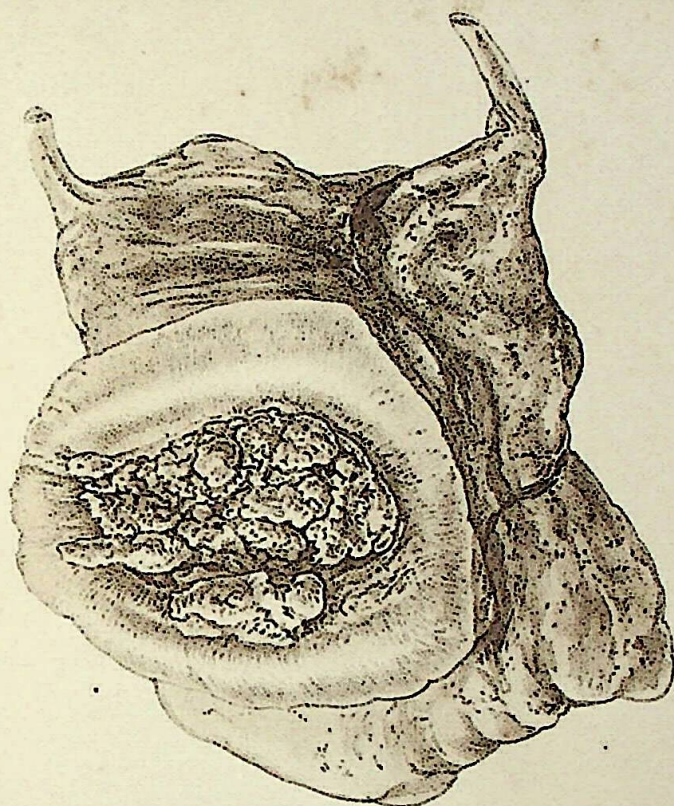


Fig. 1.

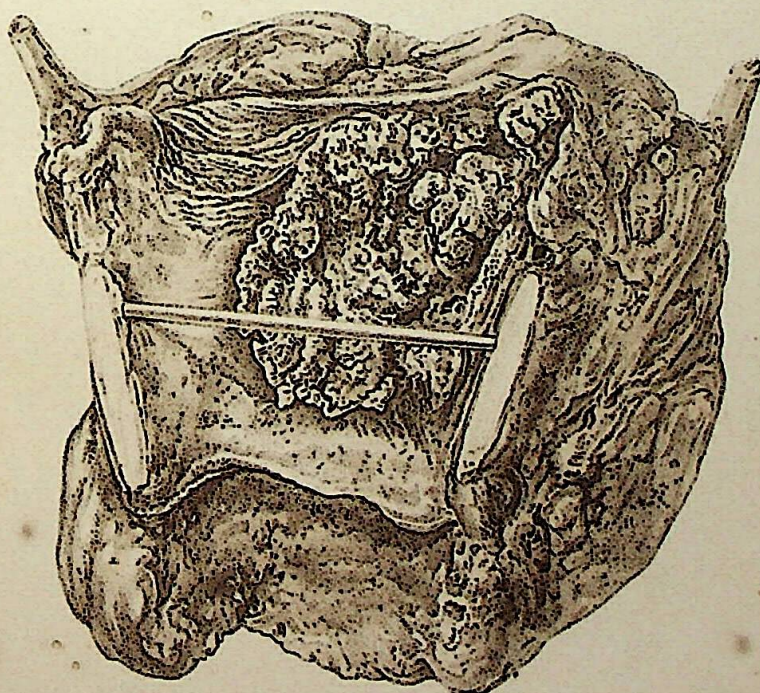


Fig. 2.

OPERATIVE SURGERY

IN THE

MEDICAL COLLEGE HOSPITAL, CALCUTTA.

CHAPTER I.

THE CLASSIFICATION OF SURGICAL OPERATIONS.

*SURGICAL OPERATIONS may be named and classified on a pathological, therapeutical, or anatomical basis: in other words, according to the disease or diseased condition for which the operation is performed; according to the nature of the operative procedure adopted for the relief or cure of the injury, disease, or deformity which it is employed to remedy; or according to the part of the body which is the subject of disease or the seat of operation. One or more of these elements enter into all terms descriptive of operations or of groups or classes of operation. The most perfect description of an operation is one which includes all three ideas; but when groups or classes of operations have to be made, it is by no means easy to determine which is the most proper and convenient principle of grouping, nor does it appear possible in the present state of medical science to employ one or other principle as a main or exclusive instrument of synthesis. It is desirable, however, for the purpose of comparing the results of operations, that some uniform system of naming and grouping should be used, in order that the names may apply to the same thing, and the groups may include

The bases of classification.

A uniform system desirable.

B

CHAP. I.

The system
adopted.

Operations are
but therapeu-
tical measures,

which, for
good reasons,
are specially
tabulated.

similar or the same items. To this end the system of naming and arranging operations laid down in the Appendix to the "Nomenclature of Diseases," drawn up by a committee appointed by the Royal College of Physicians of London, and published in 1869, has been followed in this work. This arrangement has the double advantage that it is an authoritative and well-known one, and that it is used under the sanction of the Government of India for the preparation of all statistical statements relating to surgical operations. A surgical operation is after all but a mode of treating disease (including injury and deformity), and the propriety of including a particular kind of therapeutical measure in a nomenclature of diseases might be questioned. It might, on one hand, be plausibly urged, that if the extraction of a cataract is made a subject of special mention in statistical records, why not also the expulsion of a tape-worm; but, on the other hand, it may be argued that the therapeutical measures which are known as operations, are so definite and special in character that they deserve and require a separate and distinct means of representation, and that most of them import into the existing disease a new element, which in some cases constitutes a fresh incident of the case, liable to compromise gravely health and even life, and in all cases adds more or less, for a time, to the gravity and danger of the existing malady. The authors of the "Nomenclature of Diseases" have wisely followed a middle course in presenting a classification of surgical operations as an unnumbered appendix. The condition for which the operation is performed, and the issue of the case, will find their proper place of registration in the numbered nomenclature, the operation then constituting an 'unmentioned incident of treatment. The further display of the means of treatment adopted and their effect will constitute an appended or added and quite distinct exhibit. In a statement of this nature and object it would seem right that the kind

of operation resorted to should be the leading feature both of terminology and classification; that the object or condition for which the operation was performed should also be stated; and the part of the body implicated, if the operation is applicable to more than one, should be mentioned. The reason of this is obvious. The same operation may be performed for a variety of conditions which differ very materially, if not fundamentally, from each other, and which may imply a vast difference in its success. Thus, the operation of tracheotomy may be resorted to for stricture of the larynx, for tumour impeding respiration, for diphtheria, or for the removal of a foreign body from the windpipe; the mortality following the operation will be very different under these different circumstances. Again, different operations may be resorted to for the cure of the same disease—lithotomy and lithotrity for stone; and here, again, the circumstances and risks vary materially. Or, in the third place, a similar operation for similar cause may be performed in different anatomical sites—amputation, for instance; and the gravity and danger of the procedure will depend largely, if not principally, on the part of the body operated on. These considerations render it desirable, if not necessary, that all the three bases of naming and classifying above specified should be followed, and the most perfect system appears to be the adoption of the therapeutical basis as the primary one, of the pathological or teleological as the secondary, and of the anatomical as the tertiary. The classification of amputations is arranged on this principle: (1) amputation, primary or secondary, (2) for injury and for disease, (3) of the scapula and arm, shoulder-joint, &c., &c. A definite anatomical basis is also indicated, for example, under operations on bones, according as the procedure implicates head, trunk, upper extremities, and lower extremities. This system of naming and classifying is both exhaustive, rational, and convenient, but it has not been followed, and cannot

Reasons for adopting all three bases in naming and grouping.

The most perfect system.

4 CLASSIFICATION OF SURGICAL OPERATIONS.

CHAP. I.

in the present state of science be followed throughout. Thus, in some instances of names and groups the basis is anatomical, such as in "operations on bones;" then follow subsidiary classes grounded on pathology and genera of an anatomical kind. In other cases the main group is pathological—calculus; the subdivision, anatomical—salivary, biliary, &c.; and the generic term therapeutical—incision, crushing, dilatation, &c. Finally, in some instances, one term embraces all three ideas; for example, ovariectomy, which might be paraphrased—excision of the ovary for cystic disease.

The present
system defective.

The standard classification of operations is therefore more or less chaotic when criticized in the light of these principles. It is also defective, inasmuch as it omits many operations altogether, and includes many others in a miscellaneous group of "operations not classed." Still, it is the best in existence, and it is very doubtful whether the principles of classification which have been above discussed can be applied with absolute rigidity to so varied a collection of discordant elements as surgical operations present.

It has seemed best, therefore, to accept and utilize this classification as it stands, rather than endeavour to frame another which would necessarily be isolated and hard to use for purposes of comparison, and might in addition be fanciful and pedantic.

CHAPTER II.

CONDITIONS AFFECTING THE SUCCESS OF SURGICAL TREATMENT IN THE MEDICAL COLLEGE HOSPITAL.

It is absolutely necessary, for the accuracy of any comparison of figures representing vital events, not only that the things compared should be the same, but also that the events should have taken place under similar circumstances, or if not, that the differences should be clearly and plainly stated. The principal intention of this work being to set forth the results of certain surgical operations, so that the data may be available for comparison with results obtained elsewhere, care has been taken in drawing up the narratives of cases to indicate exactly the method of operation adopted, and the injuries, diseases, or deformities for which they were undertaken. In addition to this, it appears desirable to furnish some information regarding conditions of a more general kind, not of necessity associated with any particular operation or class of operations, but nevertheless very materially influencing and governing the issue and result of every operation. These may conveniently be considered under the heads of—(1) locality and climate, (2) the hospital, and (3) the patient.

(1) *Calcutta*.—Lower Bengal supplied the great majority of the cases included in this record. The Medical College Hospital is mainly filled by persons living in Calcutta and the surrounding districts, and the few who may have been born and resided elsewhere have for the most part been subjected for some time previous to admission, and must necessarily be subjected during the

Vital statistics must be supported and explained by written data.

The topography and climate of Calcutta.

CHAP. II.

Physical
geography.

period of their treatment in hospital, to the influences, local and climatic, appertaining to Calcutta and its vicinity. Calcutta is situated near the base of the Gangetic delta, on the left or eastern bank of the Hooghly river, which is one of the main branches by which the waters of the Ganges find their way into the Bay of Bengal. Its distance from the sea is 80 miles, and height above sea-level 18 feet. The soil on which the city stands is a recent alluvium, and its site is almost a dead flat, such inclination as it possesses being eastwards from the river Hooghly towards an extensive swampy tract called the Salt Lake. The ground water in the dry season stands at a distance of about 15 feet from the surface, and during the rainy season the spring level rises, owing to local rainfall and the inundation of the Ganges, almost or altogether to the ground level. The mean temperature of the year is 79.2° ; highest, in May, 86.1° ; and lowest, in January, 67.7° . The mean daily range of temperature varies from 23.2° in March, to 9.8° in August. The average rain-fall is 66 inches, and the mean humidity of the year, 75; sat. = 100. The driest month is March (humidity, 66); the moistest August (humidity, 86).

Meteorology.

Seasons.

Description of
the town.

The climate therefore is a hot moist climate, eminently favourable to the growth of vegetation and development of malaria. The year is divisible into cold, hot, and rainy seasons, lasting respectively from November to February, March to May, and June to October inclusive. 54 inches of the annual rainfall are collected in these latter months. The city stretches along the bank of the Hooghly in the form of a half-moon, the long diameter running very nearly north and south, and the short east and west. It is surrounded on every side by densely populated suburbs, the large suburb of Howrah being separated from it by the Hooghly, which is bridged. The town has, as is generally the case in India, a European and a native quarter, the former constituting the southern, and the

latter the northern and most extensive and by far the most populous portion of its area. These two sections of the town are separated by an intermediate zone, inhabited by poor Europeans, Anglo-Indians (Eurasians), Jews, Armenians, &c. The city was founded in the year 1686, and grew very rapidly as commerce increased; but in its growth little or no thought was taken for order and sanitation, and it is only within the present century that earnest effort has been made to correct those serious sanitary defects, which attained, as the town increased in size and density, a depravity probably unequalled in the history of large cities. Under enlightened and energetic administration these defects have been in great measure remedied. The streets have been widened and straightened, arrangements made for conservancy, a supply of pure water provided for, and a system of underground drainage for removal of storm water, and sewage constructed. The southern parts of the town are now in a fairly good sanitary condition; but in the northern or native parts much still remains to be done in the way of filling up foul tanks and hollows, removing filth, opening out close and crowded quarters, and extending the benefits of a pure water supply and underground drainage to the unwholesome masses of huts occupied by the poorer class of natives. The sanitary state of the suburbs is less satisfactory than that of the town. The population of the town, according to the latest census, is, excluding the suburbs, 433,219. Of this number, 278,762, or about 65 per cent., are Hindus; 124,430, or 28 per cent., are Mahomedans; 7,272, or 1·7 per cent., Asiatics of other castes or classes; 8,904, or 2·1 per cent., are Anglo-Indians or Eurasians; and 13,851, or 3·2 per cent., are non-Asiatics. The density of the population is on an average 107 persons per acre, but the number varies from 26 in the European to 208 in the native quarter.

Sanitary state
of the town

and suburbs.
Population.

The mean death-rate of the ten years 1871-82 was

CHAP. II.
Death-rates.

29·3 per 1,000 of the population ; but in the wards inhabited by Europeans the ratio was only 14 per 1,000, while in the wards inhabited principally or solely by natives, rates of 35 to 40 were registered.

The death-rates among different races are as follows: Hindus, 32·6 ; Mahomedans, 27·1 ; other Asiatics, 8·7 ; Eurasians, 45·4 ; non-Asiatics, 15·5.

Causes of
mortality.

The principal causes of mortality in Calcutta are fevers, bowel complaints, cholera, chest diseases, phthisis, tetanus, and trismus—the last-named disease carrying off multitudes of infants. Infant mortality is excessive, children under one year dying at the rate of 42·7 per 1,000.

Peculiarities
of the popula-
tion.

The population, both European and native, is to a large extent migratory ; only 29 per cent. of the inhabitants are born in the town. There are 179 males to every 100 females ; and the excess of adults in the population is shown in the following statement :—

Proportion of Persons living in London and Calcutta at different ages.

	Under one year.	1 to 4	5 to 19	20 to 39	40 to 59	60 and upwards.
London .	3·0	10·0	29·7	42·7	33·4	17·7
Calcutta.	1·4	5·0	20·4	26·8	48·3	20·2
						4·7

The small proportions of the young and old, and the excess of adults, are very striking, and these features are mainly established by the male population. Indeed, with a registered birth-rate of 17 and death-rate of 30, Calcutta would soon become depopulated if its numbers were not maintained by a constant stream of immigrants, mainly adult males.

Conclusion.

From these data it is abundantly clear that the conditions under which the inhabitants of Calcutta, more especially its native inhabitants, habitually live, are by no means favourable to health and life, and

this indisputable fact must be taken into account in considering the results of surgical treatment.

CHAP. II.

Foundation of
the Medical
College.

(2) *The Medical College Hospital.*—The Calcutta Medical College was organized and opened in 1835. Its foundation was the outcome of the deliberations and recommendations of a committee appointed by Lord William Bentinck, one of the most enlightened and philanthropic of the distinguished statesmen who have filled the office of Governor-General of India. A small hospital was provided in 1838 for purposes of clinical instruction. This was enlarged in 1839–40, and a lying-in hospital was constructed in 1840. In the year 1836 a committee was appointed by Lord Auckland to investigate and report on the sanitary state of Calcutta and the sufficiency of hospital accommodation for the sick poor. This committee, which was presided over by Sir John Peter Grant, submitted a most elaborate report, in which, among many other valuable suggestions, the construction of a new and larger hospital for the relief of the sick and clinical instruction of the students of the Medical College was forcibly urged. A suitable site was presented by Baboo Muttylall Seal, and the present hospital was built at a cost of about £24,000, and opened for the reception of patients in the years 1852–53. It is situated in the centre of one of the most crowded and unhealthy parts of the native town, in the ward of Colootollah, which contains 208 inhabitants per acre, and has a death-rate of 36·5 per 1,000. Till within recent years the hospital was closely surrounded by crowded and filthy bazaars and slums, and the arrangements for the conservancy and drainage of the building and its neighbourhood were most imperfect. The building is a large rectangular-parallelogram block, measuring 226 feet by 71. Its sides face north and south, in order to catch the prevailing winds, which are northerly in the cold season and southerly in the hot and rainy months. It has a handsome exterior, and consists of a

Building of
the present
hospital.

Its site and
surroundings.

CHAP. II. Description of the hospital. basement and two storeys. A broad and imposing staircase, in front of which is a capacious portico, gives access to the first story, in which native patients are accommodated. A fine staircase occupies the centre of the building, in which also are placed admission-rooms, a good operating theatre, and the hospital office; and beneath them small wards for cholera and ophthalmic cases. The main wards are situated symmetrically on each side of the staircase; there are four of these on each side, but the most westerly on each flat has been divided by louvred partitions into a number of small rooms for paying patients. The wards are also rectangular, measuring 71×23 feet. Their height is 25 feet on the lower and 27 on the upper story. Over the staircase and portico is a large room, measuring 54×50 feet, originally intended for a board or council room, but which has been allotted for native patients who have undergone serious operations. The wards in each lateral block run north and south, and the ventilation is mainly horizontal by means of two large doors at each end, some vertical ventilation being accomplished by means of openings near the roof—also at each end. They communicate with each other by a series of large arched openings, and there is some lateral ventilation in consequence of each end ward being provided with doors opening into a verandah which gives access to the latrines and lavatories. Verandahs also run along the ends of the wards. Each main ward was designed to accommodate 25 patients, but in 1865 the number was reduced to 16—the council-room ward containing 18 beds. Each patient has therefore about 9 feet of wall space, 100 superficial feet (150 in the council-room ward), and from 2,500 to 2,750 cubic feet (5,750 in the council-room ward).

Sanitary defects.

It follows from these data that the space allotted to each patient is ample, but that separate ventilation for each bed is physically impossible. Indeed, the whole

atmosphere of the hospital cannot fail to be more or less contaminated by impurity in any bed or ward. CHAP. II.

It soon became apparent to the medical officers that the hospital was by no means a healthy one, and that the subjects of surgical operations "went wrong" so frequently and seriously, that, making every allowance for an unhealthy climate and town, and for the poor physique and bad health of patients, it seemed certain there must be something radically faulty in the construction and arrangements of the hospital itself to account for the high mortality following surgical operations, and the great prevalence of diseases falling under the generic description of hospitalism, which were annually being observed and recorded. The two volumes published by Sir Joseph Fayrer, embodying the results of twelve years' experience as first surgeon, are full of evidence of the insalubrity of the hospital. This evidence will be more particularly alluded to in future chapters. Suffice it to say, that the faults of the hospital as a place for treating wounds and injuries were fully appreciated and strongly and repeatedly brought to notice by Dr. Fayrer and his colleagues; that successive committees were appointed by Government to investigate and discuss them, and suggest remedies; that in accordance with the recommendations of these, important improvements have taken place in the sanitary state of the hospital; and that a sensible change for the better has occurred in the mortality following operations; a change which had commenced during Fayrer's incumbency, has been progressing ever since, and which must be attributed in large measure to their agency and efforts. The principal sanitary improvements which the hospital has undergone are these:—(1) The crowded and filthy neighbourhood has been bought and cleared. (2) The hospital and its vicinity have been thoroughly drained. (3) A good supply of pure water has been laid on. (4) The number of beds in each ward has been reduced from 25 to

Great prevalence of hospitalism.

Steps taken to investigate and remedy faults.

CHAP. II.

Sanitary improvements made;

and still required.

Septic disease.

Selection.

Diet, &c.

16. (5) The well-ventilated and isolated council-room has been set apart for the more serious wounds and operations. (6) Improvements have been made in the ventilation of the other wards. (7) The out-door department has been removed from the basement to a separate building. (8) A new lying-in hospital of a very costly and superior description has been built. (9) New nurses' quarters have been provided. (10) Latrines and lavatories have been constructed on improved principles at the four corners of the hospital, connected to it by well-ventilated passages. (11) The system of nursing has been radically reformed; and (12) Accommodation has been provided for noisy and dangerous patients on the ground floor. It still remains to provide wards for infectious cases. These have hitherto been accommodated, as occasion arose, in tents, but in the hot and rainy months these have obvious disadvantages, and substantial and permanent provision will ere long be made for cases requiring isolation.

It is right to add, with reference to the great mortality which has taken place in the hospital from erysipelas, septicæmia, pyæmia, and other septic diseases, that a very considerable proportion of the patients dying of these causes are admitted with the disease fully developed. Dr. McConnell found that of 64 deaths caused by septic maladies, 41 had been admitted with the symptoms of them unmistakably established.

There are some other conditions affecting statistics to which it is necessary briefly to refer. No principle of selection is followed as regards surgical cases, except that the more serious and those most likely to benefit by treatment are admitted in preference to the more trivial and the obviously hopeless. The diet scales have been carefully drawn up with reference to patients' previous habits as regards food, and are sufficiently liberal; while medical officers are free to order such special diets, "extras," or stimulants as they may consider advisable or necessary. There is no hospital for

convalescents or incurables in Calcutta, and patients have therefore to be detained longer than in cities where special provision is made for these classes.

(3) *Patients*.—The patients treated in the Medical College Hospital are, as has been already stated, mostly drawn from Calcutta, its suburbs, and the neighbouring districts. The accommodation at the disposal of the first surgeon provides for 33 native males, 8 native females, 16 Christian males, and 4 Christian females; besides a few natives and Christians treated in private and paying wards. The term Christian denotes rather habits of life and food than religion or race, and includes Europeans, Eurasians, Jews, Armenians, Chinese, and some few native Christians. The great majority of the subjects of operation included in this work were Hindus, next come Mahomedans, next Eurasians; and the number of Europeans, Jews, &c., is very small. The reason is that the “Christians” more frequently seek admission for slight affections, not requiring operative treatment, than natives. The proportion of cases among them requiring operation is therefore smaller than among natives.

Classes of patients treated.

The native of Lower Bengal is physically of feeble type. His temperament is of the fibrous or bilious type, with a strong nervous element in the higher classes, and a lymphatic tendency in the lower. The races of Upper India exhibit arthritic features, but these are entirely absent in the organization of the Bengalees. Their circumstances and habits of life are not favourable to the development of a vigorous physique, to good health, longevity, or strong vital resistance. They live for the most part in crowded and filthy villages, they lead lives of toil and privation, they drink foul water, subsist on a sparing dietary composed mostly of rice, vegetables, oil, and spices, to which vetches, fish, and very rarely flesh and milk, are added when they are able to afford it. They live in the midst of malaria, and are constantly harassed by fever and its

Physique of the Bengalee.

Habits of life.

CHAP. II.
Diseases.

Vices.

complications and sequelæ. Occasionally epidemics of malarious fever prostrate and decimate large and populous districts. Many of them exhibit chronic anaemia, enlargement of spleen and liver, diarrhoea and dysentery, set up by repeated attacks of malarious fever. Syphilis is very rife among them, and mercury is too often rashly and excessively administered for its cure. They are not as a rule addicted to spirits, but in the larger villages and towns, more especially in Calcutta and its suburbs, alcoholic excess is by no means unfrequent, and is becoming more so. Many of them consume opium and hemp to excess, and the use of tobacco and *pan* is universal. The better classes are apt to indulge freely in sweetmeats and *ghce* (clarified butter), and excessive fatness and diabetes are very common among them. Add to this, infant marriage and often unrestrained sexual debauchery, and the picture is by no means a bright or promising one as far as disease or operation is concerned.

The Bengalee
is a bad sub-
ject of opera-
tion ;

A belief exists that native Indians are remarkably tolerant of severe operations. This is true of up-country natives, but as far as the inhabitants of Calcutta and its neighbourhood are concerned, I am entirely in accord with Sir Joseph Fayrer when he writes ("Clinical Surgery in India," page 30) : "So far from being favourable subjects for surgical operations, I regard them as quite the reverse, and feel assured that to the surgeon who has had the opportunity of treating serious wounds or operations in the rustic native, the difference must be as remarkable as it is discouraging." I might cite other authorities to the same effect. Vital statistics in India are as yet too inaccurate to give any true estimate of the value of life among natives, but the practice of all insurance offices is to demand a higher premium than for European lives, which are taxed at a much higher figure than in Europe. The paucity of old men and women among Indian communities is confirmatory of this

view, and it is also a fact that natives offer a much more feeble resistance to disease than Christians. The mortality among the latter class in the Medical College Hospital in 1883, was 54 per 1,000, against 169 for natives. This striking difference is evident not only in the general mortality, but in the death-rates of special diseases, such as fever, diarrhoea, and dysentery. It must also be added that natives do not as a rule resort to hospitals for treatment until their disease has assumed serious and often irremediable intensity. They do not exhibit either pluck or hope when subjected to operation; their mental attitude mostly being a callous fatalism or a calm despair. As regards other classes of Asiatics—Jews, Armenians, Parsees, &c.—they present a better physique than the natives of Bengal; but in constitution and health they are undoubtedly inferior to European races. The term Eurasian includes half-castes and the descendants of Portuguese. They are a puny, sickly lot, and are unquestionably bad subjects of either injury or disease. The few Europeans who are treated in the Medical College are not of high type. Most of them are poor and ill-fed, and have suffered from the effects of climate, and many have been addicted to drink. On the whole, the conditions affecting the success of surgical treatment in the Medical College Hospital are by no means favourable, or such as to warrant the expectation of very brilliant results.

CHAP. II.

or disease.

Mental
attitude.

Other Asiatics.

Eurasians.

Europeans.

General con-
clusion.

CHAPTER III.

STATISTICS.

Cases included.

THE following table contains all the operations performed in my wards during the years 1879-83, arranged according to the plan laid down in the Appendix to the "Nomenclature of Diseases." The operations of each year are shown separately. All operations requiring subsequent detention in hospital have been entered, with the exception of the less serious abscesses, of which a large number have been omitted. The figures may be accepted as absolutely accurate, for they were compiled by myself, and each one is represented in succeeding chapters by a detail of the case, longer or shorter according to its importance. The table constitutes an index of the cases. The system of notation employed to indicate the several divisions, subdivisions, groups and sub-groups, and cases, is uniform throughout; the signs used being I. A. 1. a. i.; and these also supply references to cases, the numerals i., ii., &c., being used to denote series of cases of the same kind when there are several of them.

Notation.

Deaths.

Only those deaths which actually took place in hospital are entered in the table. A few patients were removed from hospital in a more or less critical state; such cases are taken into account in dealing with the mortality of special operations.

*Return of 800 Surgical Operations performed in the Medical College Hospital
during the Five Years 1879-1883.*

DESCRIPTION OF OPERATION.	Year 1879.		Year 1880.		Year 1881.		Year 1882.		Year 1883.		Total.	
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.
I.—OPERATIONS ON THE EYE AND ITS APPENDAGES.												
1. Excision of eyelids for malignant disease ...	1	0	...	...	...	...	1	0	...	...	2	0
2. For fistula lachrymalis and lachrymal obstruction ...	1	0	...	...	...	...	...	...	...	...	1	0
3. Excision of the eyeball ...	1	0	...	...	...	...	...	...	1	0	2	0
Total ...	3	0	...	...	...	...	1	0	1	0	5	0
II.—OPERATIONS ON ARTERIES.												
1. Ligature of— <i>a</i> , temporal artery for wound ...	1	0	...	...	...	...	...	...	...	...	1	0
<i>b</i> , brachial do. ...	...	...	...	...	...	...	1	0	...	...	1	0
<i>c</i> , radial do. ...	...	...	...	...	...	...	1	0	...	...	1	0
<i>d</i> , radial for traumatic aneurism ...	...	...	...	...	1	0	...	...	...	...	1	0
<i>e</i> , femoral for aneurism ...	...	...	1	0	...	...	...	...	...	...	1	0
Total ...	1	0	1	0	1	0	2	0	...	...	5	0
III.—OPERATIONS ON JOINTS.												
1. Reduction of dislocation of— <i>a</i> , shoulder-joint ...	...	...	1	0	...	...	...	...	3	0	4	0
<i>b</i> , hip-joint ...	2	0	...	...	...	...	3	0	...	...	5	0
2. Reduction of compound dislocation of knee-joint ...	1	1	...	...	...	...	...	...	...	...	1	1

CHAP.
III.

DESCRIPTION OF OPERATION.	Year 1879.		Year 1880.		Year 1881.		Year 1882.		Year 1883.		Total.	
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.
III.—OPERATIONS ON JOINTS—(continued)												
3. Extension of stiff joints— <i>a</i> , shoulder <i>b</i> , elbow <i>c</i> , knee	1 2 3 1 ...	0 0 0 0 ...	...	...	...	...	...	...	...	...	1 4 12 5 5 2 2	0 0 1 0 1 1 0
4. Incision of knee-joint	...	...	...	...	...	...	...	...	...	...	...	...
5. Excision of joints— <i>a</i> , elbow <i>b</i> , hip <i>c</i> , knee	...	...	...	...	...	...	...	...	...	...	...	...
Total	10	1	6	2	7	0	12	1	6	0	41	4
IV.—OPERATIONS ON BONES.												
1. Partial excision for necrosis (sequestrotony)	...	...	...	...	...	...	...	...	...	...	...	...
2. " " " " " " " " " " " "	3	0	10	0	2	0	...	...	4	0	19	0
3. Wire suturing of fractured patella	...	...	...	...	2	0	1	0	1	0	4	0
4. Refracture of femur	...	...	...	...	...	...	...	...	...	...	2	0
Total	3	0	10	0	4	0	3	0	6	0	26	0
V.—AMPUTATIONS.—A. FOR INJURY.												
1. Primary, through shoulder-joint...	1	1	1	0	...	...	...	...	...	...	2	1
2. " " " " " " " " " " " "	...	...	1	0	...	...	...	...	1	0	2	0
3. " " " " " " " " " " " "	2	0	1	0	...	...	...	...	...	...	3	0
4. " " " " " " " " " " " "	5	0	1	0	1	0	...	...	2	1	10	1
5. " " " " " " " " " " " "	1	1	...	...	...	...	...	...	...	...	1	1
6. " " " " " " " " " " " "	...	...	1	0	...	...	...	...	1	0	2	0
7. " " " " " " " " " " " "	...	...	...	...	...	...	...	...	...	...	...	...

DESCRIPTION OF OPERATION.	Year 1879.		Year 1880.		Year 1881.		Year 1882.		Year 1883.		Total.	
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.
VI.—TUMOURS.—B. NON-MALIGNANT—(continued).												
Lymphadenoma— <i>c</i> , of male mamilla...
14. Angioma— <i>a</i> , of right eyebrow
<i>b</i> , of external ear
<i>c</i> , of abdominal wall
<i>d</i> , of thigh
15. Lymphangioma of arm
16. Cystoma— <i>a</i> , of scalp (sebaceous)
<i>b</i> , of cheek (dermoid)
<i>c</i> , of forehead
<i>d</i> , of neck
<i>e</i> , of back
<i>f</i> , of foot
17. Axillary hematoma
18. Bronchocele
19. Papilloma— <i>a</i> , of penis and scrotum
<i>b</i> , of leg
20. Mucous polypus— <i>a</i> , of mouth
<i>b</i> , of rectum
21. Hemorrhoids, external and internal
Total	42	8	49	5	39	7	40	6	35	9	205	35
Grand total of Tumours	50	11	57	6	54	12	43	6	49	13	253	48

VII.—REMOVAL OF FOREIGN BODIES.

1. From nasal cavity ...	...	2	0	...	...	...	...	...	...	1	0	...	...	...	...	3	0
2. From pharynx ...	...	2	0	...	...	...	...	...	...	...	...	...	...	...	...	2	0
3. From cesophagus ...	...	...	...	...	...	...	...	...	...	1	0	...	...	...	...	1	0
4. From urethra ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	0
Total ...	...	4	0	...	...	...	...	...	...	2	0	...	...	...	...	7	0

VIII.—REMOVAL OF CALCULI.

1. Urethral, by forceps	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	0
2. " by incision	...	1	0	...	...	...	...	...	...	...	...	...	...	...	...	2	0
3. Vesical, by lithotomy	...	2	0	8	2	3	0	...	...	4	0	2	1	19	7	3	0
4. " by lithotripsy	...	3	0	...	...	3	0	...	...	1	0	...	...	...	1	0	1
5. " by litholapaxy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	0
Total ...	...	6	0	8	2	6	0	...	...	5	0	5	2	30	4	4	0

IX.—INCISIONS.

1. For strangulated hernia— <i>a</i> , without opening sac <i>b</i> , with opening sac	...	1	0	...	...	...	...	...	...	...	...	...	...	...	...	2	0
2. For radical cure of hernia— <i>a</i> , Wood's operation <i>b</i> , antiseptic ligature and removal of sac	...	4	1	3	1	2	2	0	...	5	2	...	...	...	...	16	9
3. Tracheotomy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	17	1
4. Laparotomy (exploratory)	...	7	4	2	2	5	0	...	...	13	1	0	...	...	...	29	7
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	17	1

DESCRIPTION OF OPERATION.	Year 1879.		Year 1880.		Year 1881.		Year 1882.		Year 1883.		Total.	
	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.	Num-ber.	Died.
IX.—INCISIONS—(continued).												
5. For fistula in ano ...	1	1	2	0	3	0	3	0	5	0	14	1
6. For anal fissure ...	1	0	2	0	...	...	...	...	...	...	3	0
7. For stricture of rectum ...	1	0	...	...	...	...	...	...	...	...	1	0
8. Perineal section ...	3	2	4	0	8	1	5	0	8	2	28	5
9. Internal urethrotomy ...	...	...	...	...	...	...	...	...	...	...	1	0
10. For hydrocele ...	...	...	...	...	...	...	...	...	...	...	...	...
11. For hæmatocoele ...	...	...	4	0	3	0	...	...	...	...	7	0
12. For bubo (with removal of glands)	5	0	3	0	2	0	3	0	5	2	18	2
13. For carbuncle ...	...	...	...	...	...	...	...	...	...	...	4	0
14. For large abscesses ...	19	3	22	4	38	5	12	0	38	2	129	14
Total	45	11	53	8	72	9	42	3	77	11	289	42
X.—REPARATIVE OPERATIONS.												
1. For atresia oris ...	...	...	...	...	...	...	...	...	...	...	...	...
2. For harelip ...	2	0	2	0	...	...	2	0	2	0	8	0
3. For restoration of lip ...	1	0	...	...	2	0	2	0	1	0	6	0
4. For cleft palate (Staphyloraphy)	...	...	...	...	...	...	...	...	...	...	2	0
5. For tongue tie ...	...	...	...	...	1	0	...	...	1	0	2	0
6. For vesico-vaginal fistula...	...	...	...	...	1	...	...	...	...	...	1	0
7. For recto-vaginal fistula ...	...	...	...	...	...	...	...	...	...	...	1	0
8. For imperforate anus ...	...	...	...	...	...	...	1	1	...	...	3	1
9. For phimosis (circumcision)	...	...	...	...	...	...	...	...	...	...	21	0
10. For epispadias ...	2	0	5	0	5	0	6	0	3	0	...	...
11. For hydropsadials ...	1	0	1	...	...	...	...	...	...	...	1	0
12. For urinary fistula...	...	...	1	...	...	...	...	...	...	...	1	0

CHAPTER IV.

OPERATIONS ON THE EYE AND ITS APPENDAGES.

Cases, 5 ; Deaths, none.

Cancer of eye-
lids.

I. 1. i. **Excision of the Upper Eyelid for Malignant Tumour.**—Hindu, æt. 17. Growth of two years' duration; partially excised; chloride of zinc repeatedly applied; recurred; left hospital unrelieved. (Dr. Palmer.)

Recurrence.

Epithelioma of
eyelids, &c.

ii. **Excision of the Eyelids for Epithelioma.**—Mahomedan male, æt. 35. Disease of eight months' duration; commenced in the lower lid; implicated the side of the nose and the left cheek; fungating; has attained the size of an apple; left eyeball displaced but healthy; tumour slightly moveable. Another hard lump in front of left ear, and another inside of left angle of lower jaw. Ablation of orbital tumour attempted. It was found to involve the inner and upper wall of the orbit; extirpation impossible. No attempt made to remove the two other tumours. Cornea sloughed and eyeball collapsed. Cavity caused by removal of tumour was filled up by granulation material. Disease recurred. Patient left hospital of his own accord 40 days after operation. No head symptoms.

Recurrence.

2. **Operation for Fistula Lachrymalis and Lachrymal Obstruction.**—A young Hindu woman was admitted for extensive necrosis of the frontal bone, of syphilitic origin. This was treated successfully by the application of dilute hydrochloric acid according to the plan recommended by Dr. Palmer. (Vide *Indian Medical Gazette*, October 1877.) The bone softened and crumbled down, and was replaced by healthy granulations, which subsequently cicatrized. While under treatment an abscess formed in the lachrymal sac, which was followed by lachrymal fistula. The canali-

Decalcification
of necrosed
bone.

culus was slit, and duct, which was found to be strictured, gradually dilated. The fistula was cured by these means. CHAP. IV.
I. 3.

3. **Excision of the Eyeball, with the rest of the contents of the Orbit, for Glioma.**—i. Hindu male, æt. 4. Seven months' duration, tumour of eyeball and behind it. Ball extirpated and orbit cleared out. Chloride of zinc (40 grains to 1 oz.) applied; wound dressed with boracic acid ointment spread on thin muslin. Healed up satisfactorily. Recovery. Left hospital 23 days after operation.

ii. **Excision of the Eyeball for Malignant Disease.** Malignant disease of eyeball.
—Hindu male, æt. 55. Commenced in the eyeball five years ago; has attained the size of an orange; lids displaced and everted. Extirpation effected by scissors. Left hospital well in 25 days; no recurrence. Recovery.

Comment.—The paucity of cases falling under this division is due, not to the infrequency of affections of the eye and its appendages requiring treatment by operation, but to the circumstance that ophthalmic surgery constitutes a separate department in the hospital, under the charge of the Professor of Ophthalmic Surgery. The fact is that eye diseases of all sorts are exceedingly common in all parts of India, and the surgery of the eye has come to form a very prominent feature in the practice of Government hospitals in all parts of India, more especially in the North-Western Provinces, where operations for cataract are performed in very large numbers, and with very satisfactory success. Other operations are by no means neglected, and a very great amount of benefit is conferred upon the people of India by English surgeons in this way (see Appendix A). The need of assistance of this kind is clearly indicated by the fact that the latest census of Bengal revealed a proportion of 14 blind persons in every 10,000 of the population—and this figure is probably considerably short of the reality—against a rate of 9·5 for the United Kingdom. The lesson taught by the few cases which were treated by operation in the first surgeon's wards during the years

Paucity of cases explained.
Eye diseases very common in India.
Proportion of blind in Bengal.

CHAP. IV

Hopelessness
of extirpating
orbital cancer.

1879-83 is the hopelessness of attempting to extirpate malignant disease which has laid hold of the walls of the orbit, while growths, even of great size or of a malignant kind, which have originated in and are confined to the eyeball, may be removed with ease, and with a reasonable hope of permanent relief.

CHAPTER V.

OPERATIONS ON ARTERIES.

Cases, 5 ; Deaths, none.

II. 1. a. Ligature of Temporal Artery for Wound. Severe bleeding from temporal artery.
—A Manilla seaman, æt. 60, got a severe lacerated wound of his forehead by the fall of a plank on his head. Profuse arterial bleeding occurred, which continued after his admission. A vessel was tied in the wound, but the bleeding continuing and the tissues being very pulpy, the anterior branch of the superficial temporal was cut down on and ligatured, which completely stayed the hæmorrhage. The wound healed up satisfactorily. Deligation. Cure.

b. Ligature of Brachial Artery for Wound.—Hindu male, æt. 35. Severe wound of lower third of right arm caused by breaking of a bottle; brachial artery, median nerve, median basilic vein, and part of biceps severed; lost much blood. Wound enlarged, and both ends of brachial artery tied; two other vessels ligatured. Catgut drain inserted, wound stitched and dressed antiseptically. Suppuration took place, and some sloughing; but on separation of sloughs, healing by granulation ensued satisfactorily. Sensation of parts supplied by median nerve lost. Could hold a pen and write. Remained 77 days in hospital. Wound of brachial artery. Deligation. Cure.

c. Ligature of Radial Artery for Wound.—Mahomedan male, æt. 30. Wound of lower third of forearm caused by an axe; much bleeding. Wound enlarged, both ends of artery tied; wound stitched and dressed antiseptically. Healed by first intention. Patient left hospital in four days. Wound of radial artery. Deligation. Cure.

d. Ligature of the Right Radial Artery for Traumatic Aneurism.—Hindu female, æt. 35. Sustained a wound of lower third of right forearm by the spike of a date palm three months before admission. Suppuration followed. An abscess was lanced by a native doctor nine days after Abscess and aneurism.

CHAP. V.	injury. Operation followed by profuse arterial bleeding.
II. 1. c.	Wound healed in a month. A pulsating swelling, gradually getting larger, succeeded. Radial artery ligatured with catgut on proximal and distal aspects of sac, which was laid open and emptied; wound drained by catgut threads and stitched with horse-hair under strict antiseptic precautions;
Ligation.	wound remained aseptic, and healed in ten days.
Recovery.	
Popliteal aneurism.	e. Ligature of the Femoral Artery for Popliteal Aneurism. —A Hindu male, æt. 25, with a history of syphilis, was admitted on 14th May with a pulsating swelling in left popliteal space, of two months' duration. The tumour was large, soft, and fluctuating; pulsation stopped on pressing femoral artery; distinct bruit audible; knee semi-flexed; ankle œdematous; general health fair. The femoral was ligatured with catgut on the 17th of May at the apex of Scarpa's triangle; operation performed antiseptically; pulsation ceased instantly and did not recur; wound healed by first intention, and was completely cicatrized on 28th of May. Tension of tumour subsided, but no consolidation of contents took place. A blister formed on the most prominent part of its surface. This was succeeded by a small sphacelus, which was being removed by cicatrization beneath, when, on 9th of July, oozing of blood was detected. This became freer; the aneurismal sac was laid open, and an attempt was made to secure the vessel above and below, but
Ligature of femoral.	welling still taking place, amputation was performed. The result of this operation is given below (Case V. B. 30, page 73).
Failure.	The sac was found on dissection to be principally composed of the surrounding tissues, and to contain a small quantity of firm clot and a large quantity of fluid blood undergoing disorganization. The cavity was perfectly sweet, though it had been practically in contact with dead material for weeks. The slough included the wall of the aneurism at a minute point when the escape of blood had taken place. It was perfectly aseptic. The operation was successful as far as permanent occlusion of the artery was concerned, but this measure failed to procure consolidation of the aneurism, which was very large and practically diffuse.
Hæmorrhage.	
Unsuccessful direct operation.	
Amputation.	
Recovery.	

Comment.—The rarity of arterial disease is a very remarkable feature of Indian surgery. These records

give mention of two cases of non-traumatic aneurism: CHAP. V.
one, the remarkable case *a.* above narrated; and another a case of aneurism of the abdominal aorta (IX. 4) Rarity of
arterial disease
in India.
detailed in Chapter XV., in which an exploratory

laparotomy was performed. Both subjects were natives of India, one a Hindu, aged 25 years, and the other a Mahomedan, aged 40. The conclusion drawn from these statistics is entirely borne out by general experience in practice, and confirmed by examination of statistics published elsewhere. I cannot recollect having in private practice met with an aneurism in a native during the whole of my service in India. Sir Joseph Fayrer narrates only two cases of aneurism in Fayrer's
observations.
his "Clinical Surgery," and three in his "Clinical and Pathological Observations." Of these five cases, one seems rather to have been a cavernous angioma, two were undoubtedly traumatic, and the remaining two

had a very pronounced traumatic element in their causation. The annual reports of Government dispensaries and hospitals throughout India have elaborate tables of diseases treated and operations performed appended to them. I have searched these, and found very few cases of aneurism included in them. This will appear from the tabular statements which constitute Appendix A of this work. Surgeon-Major E. Lawrie, M.B., Professor of Surgery in the Lawrie's
statistics.
Lahore Medical School, has published in the *Indian Medical Gazette* (vol. xviii., 1882, p. 239, and vol. xix., 1883, p. 255) very valuable statistics of surgical operations performed by him in the Mayo Hospital. The number of operations included in his tables, which are arranged on the same plan as the table printed above (Chapter III.), is 986. It is remarkable that in both his tables the section "Operations on Arteries" is absent.

In further illustration of this subject I have prepared the following statement from the tables appended to the reports of the Sanitary Commissioner with the

Government of India for the years 1878-82 inclusive :—

Prevalence of
aneurism
among
Europeans
and natives
contrasted,

Statement showing the prevalence of Aneurism in the European and native armies of India and among prisoners.

	European Army.		Native Army.		Prisoners.	
Strength	290,120		652,294		547,287	
	Admis- sions.	Deaths.	Admis- sions.	Deaths.	Admis- sions.	Deaths.
Numbers	127	58	46	18	36	28
Per 1000 of strength...	'43	'19	'07	'03	'06	'05

and of valvular heart disease.

The statistics of valvular disease of the heart are as follows :—

Numbers	584	84	275	136	212	99
Per 1000 of strength...	2'01	'28	'42	'20	'38	'18

Explanation.

From these considerations and data it may be laid down with confidence that aneurism is a very rare disease among the natives of India; and it may also be asserted—though on this point I am unable to adduce statistical evidence—that arterial disease of every kind is infrequent among natives of India as compared with the inhabitants of the British Islands. The main cause of this difference is, I believe, a difference of pathological proclivities in the two races, and this depends on fundamental diathetic distinctions. The native of India is of a bilious or neuro-bilious temperament, while the majority of the inhabitants of the British Islands exhibit arthritic and vascular characters and predispositions. Atheroma, syphilis, strain, and injury are the most prominent causes of aneurismal disease. The three latter causes are quite as common in India as in England; but the subacute inflammation of the arterial

tunics, which result in atheroma, whether of diathetic or syphilitic origin, is not so common in India as in England. The case of popliteal aneurism (e) detailed above, presents several important special features. The failure to procure consolidation of its contents, although the femoral artery was successfully ligatured, and pulsation ceased from the moment of deligation, and thenceforward, is noteworthy. The efficiency of the catgut ligature and the rapid closure of the wound under antiseptic management are satisfactory circumstances in the case. But the most remarkable and important point is the prevention of putrefaction in the cavity of the sac by means of antiseptic dressings for so long a period, although a portion of the skin covering it underwent sphacelation, and this slough lay very close to the large mass of eminently putrescible fluid contained in the cavity of the tumour.

Illustration of
the benefit of
antiseptic
treatment.

CHAPTER VI.

OPERATIONS ON JOINTS.

Cases, 41; Deaths, 4.

- Dislocation one month old.** **III. 1. a. Reduction of Dislocation of Shoulder-joint.**
 —i. Hindu male, æt. 43. One month's duration; caused by a fall. Reduced by traction under chloroform by means of pulleys; slight synovitis followed, which subsided, and the resulting stiffness was remedied by passive movements.
- Ditto.** ii. Hindu male, æt. 24. Subcoracoid; one month's duration; occurred during an epileptic fit. Reduced under chloroform by traction with the heel in the axilla. Operation followed by several epileptic fits. Left hospital in 10 days.
- Recent dislocation.** iii. Englishman, æt. 40, a jockey. Recent; post-glenoid; caused by a fall. Reduction effected by traction with the heel in the axilla, without chloroform. Suffered subsequently from neuralgia of the branches of the brachial plexus, and remained in hospital 27 days.
- Ditto.** iv. Mahomedan male, æt. 30. Recent; subglenoid; caused by overreaching in attempting to strike another man. Reduced by traction with the heel in the axilla. Left hospital the same day.
- Recent dorsal dislocation of hip.** **b. Reduction of Dislocation of Hip-joint.**—i. A Mahomedan male, æt. 65, was knocked down by a bullock; the hip-joint was dislocated backwards, head of femur resting on dorsum ilii. Came to hospital a week after the accident. Dislocation reduced under chloroform by manipulation. The bone subsequently escaped from the acetabulum. (Dr. Palmer.)
- Dislocation into sciatic notch, one month old.** ii. Mahomedan boy, æt. 9, sustained dislocation of the head of the right femur into the sciatic notch, about a month ago. Put under chloroform, and the dislocation reduced by manipulation; the limb kept in position by splint and extension. There was slight prominence of the right

trochanter major after reduction, but the shortening and inversion were corrected. CHAP. VI.

iii. Hindu male, æt. 10. Left side; dorsal; of 7 days' duration; caused by a fall. Reduced by manipulation under chloroform. Patient left hospital same day. III. 1. 2. 3.
Dorsal
dislocation.

iv. Hindu male, æt. 35. Left side; dorsal; one day's duration; caused by fall of a bale of jute on the back. Reduced by manipulation under chloroform. Left hospital in 9 days. Ditto.

v. Hindu male, æt. 30. Left side; dorsal; of one day's duration; caused by fall of a bale of jute on the back. Reduced by manipulation under chloroform. Left hospital in 15 days. Ditto.

Both these accidents were caused by the same bale of jute. The reduction was effected by Dr. R. D. Murray, resident surgeon.

2. **Reduction of Compound Dislocation of Knee-joint.** Compound forward dislocation of knee.
—A Hindu labourer, æt. 38, was brought to the hospital on 12th November with compound dislocation of right knee, caused by a bag of wheat having fallen on his thigh. The condyles of the femur protruded through a transverse wound behind the joint, and the posterior tibial pulsation could not be felt until reduction had been effected. This was done under chloroform by extension. The wound was syringed out with carbolic lotion, two drainage tubes inserted, the wound stitched, an antiseptic dressing applied, and the limb kept at rest by a splint. Rum and beef-tea were given frequently, and ice-bags applied to the joint; temperature rose to $104^{\circ}6'$ next morning. He had severe rigors and a pulse of 114. Drainage was free, and no accumulation took place in the joint. He was thirsty and feverish ($103^{\circ}6'$) all day, and complaining of pain in the joint: discharge profuse. Symptom of collapse set in during the night, and prostration increased until he died of exhaustion at $6\frac{1}{2}$ A.M. on the 14th. The discharge continued profuse, and was devoid of fætor to the last. Reduction.

Severe reaction.

Death by exhaustion.

3. **Extension of Stiff Joints.**—*a.* **Shoulder.**—Hindu male, æt. 16, had an abscess in the left pectoral region, which pointed in the axilla, seven months ago. It was opened imperfectly, hence resulted in a sinus. There was burrowing of matter in all directions. The abscess was cured by means Stiff shoulder-joint.

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III. 3. b.

Forcible
movement.

Improvement.

Stiff elbow
from crocodile
bite.Forcible
movement.

Improvement.

Stiff elbow
from small-
pox.

of free drainage and free incisions. During the course of treatment he had an attack of erysipelas, which extended along the left arm and involved the whole of the trunk. The left arm was kept constantly at his side. He was treated at home, and applied at the hospital for relief on account of a stiff shoulder. The left shoulder-joint was found ankylosed. The arm could be raised from the side to a slight extent, and could be moved backwards and forwards. No rotation could be accomplished. Under chloroform the joint was moved forcibly in almost every direction; in doing so grating was detected. The head of the humerus was separate from the shaft, but there was no displacement. By passive motion the movements were rendered free. Discharged after a month, much relieved, though the movements of the shoulders were not restored to their full extent.

b. **Elbow.**—i. An Ooria male, æt. 31, about a year and a half ago sustained compound fracture of the left forearm, and severe lacerated wounds of the same. These were produced by the teeth of a crocodile. Profuse suppuration and sloughing ensued, and bits of necrosed bones came away. He kept his forearm in a straight position—i.e. in a line with the arm. On admission the left elbow was found ankylosed. A few sinuses were situated in the middle of the forearm, leading to necrosed bone. The muscles were partially destroyed. The fingers were very weak. Put under chloroform, the elbow was bent forcibly to less than a right angle. During the procedure the bones of the forearm gave way, as the union was not very firm. The forearm was put up in splints. The joint was forcibly moved under chloroform on two more occasions. The sinuses healed up. The bones united firmly. The movements of joints were much freer. There was slight inflammation of the joint after each forcible movement. Discharged after 79 days.

ii. Hindu girl, æt. 9 (married). Had small-pox two months ago, followed by several symmetrical abscesses about the shoulders and elbows.

Both the elbows were stiffened, thickened, and painful. A bit of the right acromion was found to be necrosed, and was removed. The joints were forcibly moved under

chloroform. Passive motion was afterwards regularly maintained. As the muscles were atrophied, they were stimulated by means of electricity. Discharged after 74 days, much improved.

CHAP. VI.

III. 3. c.

iii. Hindu male, æt. 20. Elbow stiff, bent at an angle of 30° . Forcibly extended under chloroform, followed by frequent passive movement. Left hospital in 33 days, greatly improved.

iv. Mahomedan male, æt. 40. Joint stiffened at a right angle, the result of rheumatic arthritis; forcible extension under chloroform followed by passive motion. Movements restored almost to normal limits: 19 days in hospital.

c. Knee.—i. Mahomedan youth, æt. 20. Had small-pox six months ago; about a month afterwards two abscesses formed—one in each leg. The lower limbs were supported on pillows in a flexed condition. Since then the knee could not be stretched properly. Flexion of the knees complete; they could be extended to more than a right angle. The right knee freer in its movements than the left. The joints were completely stretched under chloroform, and put up on a McIntyre splint. Gradual extension by the same splint had been tried without benefit. There was slight effusion into the joint, which soon disappeared. After a month he was allowed to walk about. Then he was subjected to another operation for the removal of bits of necrosed bone from left fibula and right radius. He was discharged, almost completely cured, in 75 days.

Stiff knee.
from small-
pox.

Forcible
extension.

Improvement.

ii. Bengalee Brahmin, male, æt. 52. Had inflammation of right knee seven months ago, which was followed by ankylosis. The joint was bent almost at a right angle. Slight flexion and extension could be produced by a little forcible movement.

Stiff knee
from arthritis.

He was put under chloroform and the joint stretched fully. The fibrous adhesions gave away. The limb was then put upon a McIntyre splint in a straight position. The patient was very nervous, and was discharged at his own request with a comparatively straight limb in two days.

Forcible
extension.

iii. Mahomedan male, æt. 40. Fifteen months ago he had a cut on the inner aspect of the left knee caused by an axe. Apparently the joint was laid open. There was suppuration in the joint as well as in the adjacent portions of thigh and

Stiff knee
from wound.

CHAP. VI.

III. 3. c.

leg. The wound healed up in four months, but the joint became ankylosed. It was fixed at an obtuse angle. Flexion and extension almost absent.

Forcible extension.

Improvement.

Stiff knee from wound.

For a few days, by means of elastic bandage and McIntyre's splint, the limb was kept extended (very slightly). After a week, finding the result to be not very satisfactory, the joint was forcibly stretched under chloroform. The patient objected to undergo the pain necessary for his cure, and left the hospital in twelve days, somewhat improved.

iv. Eurasian male, æt. 14. Bent knee consequent on a recent wound in popliteal space. Extended gradually by McIntyre's splint. Left hospital in nine days with a straight and flexible joint.

Stiff knee from arthritis.

v. Hindu male, æt. 26. Joint fixed at angle of 100° ; six months' duration; followed strumous inflammation. Forcible extension under chloroform, followed by gradual straightening by means of McIntyre's splint. Remained in hospital 52 days, and left with a straight leg, but somewhat stiff joint. Could walk firmly with the aid of a stick.

Stiff knee from abscess.

vi. Hindu male, æt. 26. Knee bent at an angle of 125° ; history of inflammation of leg, and abscess and sinus in popliteal space. Commenced about a year before admission. Forcible extension under chloroform and gradual straightening with McIntyre's splint. Deep ulcer formed above patella from pressure of bandage. Remained in hospital 204 days, and left with a straight leg; joint somewhat tender. Required the use of crutches.

Stiff knee from gonorrhoeal arthritis.

vii. Hindu male, æt. 37. Left knee-joint; four months' standing; followed gonorrhoeal arthritis; bent at a right angle. Straightened forcibly under chloroform and put on a McIntyre splint. Left hospital in 85 days with a straight but stiff joint.

Stiff knee from syphilitic arthritis.

viii. Hindu male, æt. 45. Both knee-joints affected; disease (syphilitic arthritis) of eight months' duration; joints swollen and permanently flexed at an acute angle; both forcibly stretched under chloroform—right easily; popliteal skin gave way when left was nearly straightened. Wound dressed antiseptically, and both limbs placed on McIntyre splints. Patient detained in hospital 179 days. Left with straight but stiff limbs; able to stand firmly and walk a little.

Rupture of skin.

Recovery.

ix. East Indian male, æt. 25. Left side; from gonorrhœal inflammation of seven months' duration; joint firmly flexed and patella fixed, forcibly extended under chloroform and put on a McIntyre splint. Remained 89 days in hospital. Left with a straight limb; knee-joint admitted of some movement.

CHAP. VI.

III. 3. c.

Stiff knee from gonorrhœal arthritis.

x. Hindu male, æt. 18. History of gonorrhœa, measles, fever, stricture, and urethral fever. Both knees have gradually become stiffened and bent from being habitually retained in that position. Hip-joints also flexed and stiff. Has large cicatrices of deep bed-sores on buttocks and heels. Is in very feeble health. Three days after admission the right knee was forcibly stretched under chloroform, and put upon a McIntyre splint. Pulley and weight adapted to leg to maintain extension. This was followed by fever for two days. Got retention of urine, which was relieved by catheter; urethra found to be strictured and fully dilated. Nine days after admission (six after the first operation), his health having apparently been restored, the left knee was similarly dealt with. This was followed by shock, which proved fatal in ten hours. On *post-mortem* examination, both knee-joints were found to contain some blood mixed with synovia. Ecchymosis existed around the joint. The popliteal vessels were uninjured. The cavities of the heart, which was flabby and dilated, were full of decolorized clot. The membranes of the brain were in a state of chronic thickening and congestion, with effusion into the ventricles; liver congested, spleen enlarged, kidneys undergoing contraction.

Stiff knee from gonorrhœal inflammation.

Forcible extension of right knee.

Forcible extension of left. Shock.

Death. Post-mortem appearances.

xi. Mahomedan male, æt. 35. Sustained a wound of the left knee-joint nine months ago, followed by suppuration in the joint, formation of sinuses, and permanent stiffness in a semi-flexed position. Stretched forcibly under chloroform; several bands felt giving away; limb placed on a McIntyre splint and ice applied. Joint swelled; strong fever supervened, lasting for two days. Lead and opium lotion applied, and a succession of blisters. Left hospital in 45 days, able to stand and walk without support, and to flex and extend the limb.

Stiff knee from wound.

Forcible extension.

Improvement.

xii. Hindu male, æt. 29. Right knee-joint inflamed one year ago. Pus formed in the joint, which was laid open.

CHAP. VI.

III. 4.

Stiff knee
from suppura-
tion.
Extension.

Incision.

Recovery.

Purulent syno-
vitis of knee.

Incision.

Recovery.

Suppuration
of knee-joint.

Incision.

Recovery.

Suppuration
of knee-joint.

Incision.

Anchylolysis in a semi-flexed attitude took place during the process of closure of the puncture; leg atrophied; patella moveable; constitution feeble. Forcible extension was made under chloroform, followed by the use of a McIntyre splint. The joint inflamed. Rest and counter-irritants failed to reduce the inflammation, which proceeded to suppuration. The cavity became putrid, and septic fever of severe type ensued. Under free opening and drainage this subsided, and eventually anchylolysis in a straight position was obtained. Remained six months under treatment.

4. Incision of Knee-joint.—i. A Hindu youth, *æt.* 18 years. Four years ago he had synovitis after prolonged walking—of the left knee only. Was cured by aspirating in this hospital. A second attack was cured by rest only. On admission the joint was considerably swollen; about 8 ozs. of puriform fluid were drawn off by aspirator. Re-accumulation of fluid having taken place, an opening was made into the supra-patellar pouch with a knife under spray, and about 4 ozs. of pus let out. Dressed with carbolic gauze. This was done a month after his admission. The operation was followed by no constitutional disturbance. The dressings were changed every third or fourth day. The discharge gradually diminished in quantity, the distension of the joint disappeared, and he left the hospital after ten days with a stiff knee-joint, but a serviceable limb.

ii. Eurasian female, *æt.* 43. Elephantiasis of both legs. Numerous abscesses of right leg; knee-joint inflamed and became filled with pus. It was laid open antiseptically, and drainage tubes inserted; these were gradually shortened and the sinus finally closed, leaving a straight and stiff joint. The abscesses of the leg were also treated successfully, and the elephantoid swelling went down considerably in consequence of the suppuration.

iii. Hindu male, *æt.* 28. Left knee; acute synovitis following chicken-pox. The joint was enormously swollen, and on tapping it, sero-purulent material issued in large quantity, and the cavity collapsed. It re-accumulated in a few days, and a free incision was made under antiseptic precautions into the supra-patellar pouch. A drainage tube was inserted, and an antiseptic dressing applied. No further accumulation occurred, and the symptoms, local and constitu-

CHAP. VI.

III. 4.

Recovery.

Compound fracture of leg implicating knee-joint.

Tapping.

Incision.

Recovery.

Pyæmic inflammation of tunica

and knee.

Incision.

Recovery.

tional, promptly subsided ; the tube was gradually shortened, and finally removed in 18 days. He was discharged in 89 days with a useful joint.

iv. Hindu male, æt. 25, sustained a compound fracture of the left leg, about 24 hours before admission, by a fall on some bricks from a height of about 10 feet. The fracture was oblique and knee-joint much swollen. The wound was dressed antiseptically, but putrefaction supervened. He had great constitutional disturbance. Seven days after admission the knee-joint was tapped with a fine trochar, and a quantity of sanguineous serum let out. Re-accumulation taking place in three days, it was freely incised above the patella, and a drainage tube inserted: this gave great relief. Discharge from the wound remained sweet, and the tube was gradually withdrawn and wound allowed to close. Extensive suppurative cellulitis occurred up and down the limb, requiring numerous counter-openings. Several pieces of necrosed bone had to be removed, but the wound eventually closed, and firm union took place, and the function of the limb was restored. He remained 298 days in hospital.

v. Eurasian male, æt. 21. Admitted with erysepelalous inflammation of the scrotum and glands of the right groin and axilla, following a wound on the left great toe. The right knee-joint was also painful and distended, and severe fever of a low type existed. The right tunica vaginalis was found on exploration to contain turbid serum, and was laid open and drained antiseptically. The knee-joint became more swollen, tense, and painful, and constitutional symptoms more urgent. Two days after admission the joint was tapped by a fine trochar, and found to contain pus. An incision was made and drainage tube introduced under antiseptic precautions. His state at this time was extremely critical. Improvement soon followed the operation, and under antiseptic treatment both tunica and joint recovered; the erysipelas and constitutional disturbance quickly abating. The knee-joint remained somewhat stiff and tender, and passive movement under chloroform was repeatedly resorted to. The glandular swellings underwent resolution. He left hospital in 98 days in good health, with slight stiffness of the joint.

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III. 5. a.

Remarks on
Case v.

This was a case of very severe external pyæmia resulting in suppuration of the right tunica vaginalis and knee-joint. Free incision and subsequent drainage under strict antiseptic precautions were followed by marked and progressive improvement, eventuating in recovery.

Suppuration of
elbow-joint.

Resection.

Death from
pyæmia.Suppuration of
elbow-joint.

Resection.

Recovery.

Disease of
elbow-joint
from small-
pox.

Resection.

Recovery.

5. Excision of Joints.—a. Elbow.—i. Hindu male, æt.

49. Admitted for stricture of urethra and fistula in ano. His general health was bad. A large abscess suddenly formed above right elbow, stripping the humerus extensively, and involving the joint, which became disorganized. Resection was performed on 23rd January; about $3\frac{1}{2}$ inches of humerus had to be removed. The wound putrefied; patient suffered from diarrhœa, but rallied, and was progressing favourably, when acute peritonitis set in and killed him in three days. He survived the operation 28 days. The humerus was found stripped to the extent of an inch, and its medulla inflamed.

ii. Hindu female, æt. 40. Suppuration of left elbow-joint, which was distended with pus and grated on movement. Arm and forearm extremely œdematous. Resection performed antiseptically and subperiosteally by single longitudinal incision. Cartilages found eroded and partly exfoliated: end of bones sawn off. Wound remained sweet; no constitutional disorder. Passive motion commenced on 20th day. Remained in hospital 98 days; left with a sound and freely moveable false elbow-joint.

iii. Hindu male, æt. 6. Was inoculated four years ago. This led to necrosis of several bones—right tibia and fibula, left fibula and left humerus. Elbow-joint of left side stiff from thickening of lower end of humerus. Resection performed by straight posterior incision. Sequestrum, consisting of two inches of lower end of shaft, removed and ends of bones sawn off. Passive motion commenced on 9th day. Abscess formed after wound in cavity had healed, necessitating incision and giving rise to much effusion. Remained in hospital 170 days after operation, and left with a stiff joint in semi-flexed position.

iv. Hindu male, æt. 37, sustained a severe compound comminuted fracture of left elbow by a fall off a tree; long

lacerated wound at back of joint, through which the joint was reached and numerous fragments of the bones entering into its formation felt; arteries and nerves intact. Resection was performed in the usual way, and about two inches of humerus and $1\frac{1}{2}$ of radius and ulna removed. Ten separate pieces of bone were taken out of the cavity. Notwithstanding rigid antiseptic precautions, the wound putrefied on the third day and suppurated on the fifth. There was very little constitutional disturbance; the cavity gradually filled by granulation, and the patient left the hospital in 44 days with a strong and useful arm, the joint permitting of a wide range of movement.

CHAP. VI.
III. 5. a. b.
Compound
fracture of
elbow-joint.
Resection.

Recovery.

v. Hindu male, æt. 20, was bitten by a tiger in the right elbow seven months before admission. General inflammation of the limb ensued, and he came with a stiff elbow riddled with sinuses leading to bare bone, and fingers incapable of motion, owing to the results of thecal inflammation. The nails of this hand had fissures across them, indicating entire interruption to growth for a short period. Five days after admission the elbow-joint was resected by single vertical dorsal incision. Boro-glyceride lotion (1 in 20 parts) was used as a lotion and dressing, but it failed to keep the wound aseptic. Suppuration took place, but eventually satisfactory repair was procured, and by means of passive movement of the elbow, wrist, and fingers, a considerable range of movement was restored. He remained in hospital 75 days.

Tiger bite of
elbow.

Resection.

Recovery.

b. Hip-joint.—i. A Hindu child, æt. 2 years; admitted 11th August 1879; sustained a fall two months before admission. A fluctuating swelling existed, and was opened; two other openings had subsequently to be made to evacuate matter. The joint was found to be disorganized and femur dislocated on dorsum. The acetabulum was perforated, and an abscess formed in the right iliac fossa; fever of a hectic type existed. After a long period of treatment by drainage, feeding, cod-liver oil, iodide of iron, &c., excision of the joint was performed on 14th July 1880; a transverse incision was made behind the joint, the periosteum was detached, and the head of the femur was removed through the trochanter major. The acetabulum was scraped by an osteotrite. For several weeks progress was favourable; the

Traumatic
abscess of hip-
joint.

Excision.

CHAP. VI.	wound was almost closed, and the general health improved, when fever and diarrhoea set in; the granulation material broke down, and the end of the bone was again exposed. Discharge became profuse, symptoms of tubercle appeared in the apex of the left lung, and the patient finally died of exhaustion on the 12th of August, 69 days after the operation.
III. 5. b. c.	
Death from phthisis.	
Injury of hip-joint.	ii. Mahomedan male, æt. 16, sustained an injury of the left hip about a year before admission, followed by fever, inflammation, and abscesses, which were opened and gave rise to three sinuses. Dorsal dislocation of femur; hip rigidly flexed; limb shortened and wasted, somewhat inverted; shaft of femur thickened. Curved incision made behind trochanter major. Necrosed head of femur removed, and seven or eight pieces of dead bone taken out. Limb placed in straight position, and secured by long splint and weight; recovery slow. Two sinuses, on the anterior and inner aspect of the thigh, continued long to discharge. Was eventually able to walk with the aid of crutches, and left hospital, after a stay of 312 days, in good health and with every prospect of regaining the use of the left leg; the new hip-joint admitted of a considerable range of movement.
Excision.	
Recovery.	
Suppuration of knee-joint.	c. Knee-joint.—i. Hindu male, æt. 42. Arthritis of left knee four years ago; history of subsequent suppuration treated by incision; knee firmly flexed at a right angle; head of tibia dislocated outwards. Recent abscess of popliteal space opened, and leaving a sinus; leg wasted. Resected antiseptically by semilunar incision below patella, which was removed. Ends of bones forcibly separated; half an inch sawn off tibia, and about two inches off femur. Tendons of semitendinosus and biceps divided subcutaneously; ends of bones drilled and united by twisted wires. Catgut drain brought out at each angle of wound. Pursued an aseptic course. No suppuration or constitutional disturbance; wound healed by first intention. Drain melted away, and ends removed in 8 days; wires removed after 69 days. Left hospital in 150 days with a firm straight limb about three inches shorter than the other, and able to walk with a high heeled and soled shoe.
Resection.	
Wiring.	
Recovery.	

This case pursued a typical aseptic course. The

union of the ends of the bones by wire undoubtedly accelerated recovery.

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III. 5. c.

ii. Hindu male, æt. 30. Disease of joint of nine years' standing; much worse within last year; swollen, tender; bent at an angle of 145° ; movements limited; some lateral motion; some crackling; starting at night. Health bad, anæmic; gums spongy; leg much wasted, but not cedematous. Resected about a month after admission, after other treatment failed; semilunar incision below level of patella, which was left; about half an inch cut off ends of bones; joint quite disorganized; bones infiltrated and soft; catgut drains inserted; operation done antiseptically. Considerable local and constitutional disturbance ensued. Cellulitis extended up the femur, and resulted in abscess, which required free opening; other abscesses formed, communicating with wound cavity. Wound healed imperfectly, and a low form of inflammation with profuse suppuration, resulting in multiple sinuses, continued; symptoms of hectic, with great emaciation and exhaustion, supervened, and it was considered advisable to amputate the limb, 71 days after the resection. (See below, Case V. 29. ii.)

Disorganization of knee-joint.

Resection.

Burrowing.

Amputation.

It would probably have been better had amputation been performed in this case in the first instance.

Comment.—Diseased joints are very frequently seen in India. Catarrhal inflammation, caused by exposure, fatigue, injury, and malaria, is very common, and the synovitis sometimes becomes chronic, resulting in hydrops articuli, and occasionally proceeds to suppuration, terminating, in extreme cases, in disorganization of the joint. Illustrations of this result are furnished by Cases III. 5. a. ii.; III. 5. c. ii.; V. 29. i. iii. and iv. Gonorrhœal synovitis is often met with, almost invariably, in the knee joint or joints; but this condition in most cases undergoes resolution without permanent damage to the joint. When rest and proper treatment are neglected, some degree of arthritis may occur, and stiffening of the joint may result. In very feeble

Joint diseases met with in India.

Catarrhal synovitis.

Gonorrhœal synovitis.

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Rheumatic and
syphilitic
arthritis.

constitutions the inflammation may be suppurative, and end in the destruction of the articulation.

Rheumatic arthritis is not unfrequent, and inflammation of syphilitic origin is also met with.

Syphilis appears, however, in natives of India, to affect more frequently cutaneous and mucous tissues, rather than osseous, articular, and vascular, although examples of the latter and of visceral lesions are sometimes seen.

Joint disease
caused by
small-pox.

Joint disease consequent on small-pox is illustrated by three cases in these records—III. 3. *a. ii.* ; III. 3. *c. i.* ; and III. 5. *a. iii.*—and presents features deserving of special attention.

Pathology.

No case came under observation in an early stage, but from what was noticed in these three cases, and in another to be mentioned presently, it would appear—(1) that the mischief commences outside rather than inside of the joint, (2) that the affection is a suppurative periostitis or epiphysitis, and (3) that the joint is secondarily implicated either by stiffening or complete destruction. These views are rendered probable by the fact that in two of the cases suppurative periostitis, resulting in necrosis, had taken place elsewhere. In the two first cases the joints were simply stiffened, requiring forcible movement under chloroform. In one of them a bit of necrosed olecranon had to be removed. In the third case the joint had been destroyed, and resection became necessary. The lower end of the humerus had undergone necrosis. In another case which came under treatment, but did not require operation, suppurative epiphysitis of the bones entering into the formation of both elbow-joints had occurred after small-pox. All the epiphyses had been detached from their shafts, numerous sinuses led to surfaces of bare bone, and the joints felt like bags of necrosed fragments. Under rest, careful dressing, and suitable constitutional treatment, recovery took place. The sinuses closed up, and useful joints with considerable mobility remained. An exceedingly interesting

Illustrative
cases.

group of cases of this description was published by Surgeon-Major C. H. Joubert, M.B., F.R.C.S., Civil Surgeon of Darjeeling, in the *Indian Medical Gazette* (vol. xviii., page 230). A girl of 15 applied to him for relief, in February 1883, on account of straight ankylosis of both elbow-joints. The history given was, that "about three years ago an inoculator had come to Elan, in Nepal, and had operated upon a number of people from small-pox crusts. All these persons rapidly became very ill, and numbers of them died. In the family of this girl six persons were inoculated, of whom two, the mother and a boy of 19, died. The patient and three other younger children recovered after long and severe illnesses, but all with one or more joints of the upper extremities ankylosed." Dr. Joubert surmises that the crusts used must have undergone some septic change, and adds that "inoculation has since been performed at Elan without fatal results." Two of the other three children were subsequently brought to Darjeeling for treatment—a girl of 14, with ankylosed right elbow-joint, and a boy of 10, with ankylosed left shoulder-joint, and both elbow-joints ankylosed in a straight position. Both the elbow-joints of the boy were excised with satisfactory result. The right elbow-joint of the younger girl was also removed successfully, and sequestra were taken from the forearm of the elder girl, and her right elbow-joint resected. The joints in all cases were found to have been obliterated, and the ends of the bones joined by osseous material.

CHAP. VI.
Joubert's
cases.

But while acute diseases of the articulations of the kinds and causes stated are very common, chronic disease of joints of a strumous description and origin is extremely rare among natives. White swellings and cases of true morbus coxæ are sometimes met with in European and Eurasian children—seldom, if ever, in natives. The slow process of conversion of the articular ends of the bones into masses of granu-

Strumous
joint disease
rare in India.

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lation material, and the consequent impairment or destruction of the joint, as the granulation material invades the synovial membrane, cartilages, and ligaments, together with the events which follow absorption, degeneration, suppuration, or death of the new material, are sequences of which Indian practice supplies few if any examples. When joint disease commences outside of the joint cavity, it is generally in consequence of injury, wound, bruise, or fracture, or of abscess originating beneath the periosteum in the epiphysial plates, or in the soft parts in the neighbourhood of the joint. This rarity of strumous tubercular or chronic arthritic disease of joints, has also been pointedly indicated by Mr. C. Macnamara, who has made the diseases of bones and joints a special study, and has had abundant opportunity of contrasting the comparative prevalence of special forms of joint affection in India and England.

Macnamara's
experience.

Having offered these general observations on this class of cases, I may now add a few comments on each of the groups included in this chapter.

Remarks on
dislocations.

Dislocations are, as a rule, treated in the outdoor department, and it is only those which required detention in hospital after reduction that are included in this series. The fatal case of compound dislocation of the knee-joint is worthy of special notice. Death was due apparently to the exhaustion caused by excessive reaction following great shock.

Forcible move-
ment of stiff
joints.

The forcible bending of stiffened joints for the purpose of restoring movement or procuring a more favourable position, is illustrated by seventeen cases. In many other cases of fracture, &c., this practice was resorted to as a means of restoring limbs to usefulness. In the cases recorded the operation held a predominant place in their treatment.

Causes of
stiffening.

The cause of stiffening may be outside of the joint or inside. If outside, it may depend (a) upon rigidly contracted muscles and prolonged recumbency, or (b)

upon the result of inflammatory thickening of the fibrous textures surrounding the joint—the remains of a severe synovitis which has undergone resolution as far as the cavity of the joint is concerned, prolonged retention in a faulty position generally adding to the mischief, or (*c*) upon cicatrices the result of wound, or ulcer, or abscess. If within the joint there are (*d*) fibrous adhesions between opposed cartilaginous or synovial surfaces, the cartilage or synovial membrane having undergone destruction. This condition may result from penetrating injury or inflammation, and is often the sequel of an open joint. In this case there is also generally thickening and contraction outside the joint as well. In case (*a*) stretching can generally be accomplished at once and to the full and without tearing. It is advisable to put the limb on a splint for a few days, and then resort to regular passive movement. There is seldom, if ever, any irritation resulting from stretching in such cases. In case (*b*) the completeness of stretching will depend on the strength of the adhesions and the state of the skin. In some cases the joint can be fully stretched at once, in others the cure must be completed by the use of splints, weights, or elastic bandages. In all these cases there is tearing at the time, and more or less irritation for a few days after the operation. A second or third attempt may be made under chloroform, and passive motion should be resorted to after rest. The treatment in case (*c*) will depend on the nature of the case, the position and extent of the cicatrix, &c. In case (*d*) more caution and time are required. They are amenable to mechanical extension, and some degree of movement can generally be restored. A more decided sensation of tearing is perceptible in these cases, and very often, especially in the case of the knee, a certain amount of dislocation results. Irritation of the joint is more pronounced in these cases, often requiring ice or lead. Perseverance in treatment,

E

CHAP. VI.

however, produces decided benefit, and even if movement is not restored, the joint can be placed in a more favourable position.

Operation inadmissible in acute cases.

Two remarkable cases,

In the case of joints which are the seat of actual disease, whether of an acute, sub-acute, or chronic kind, forcible stretching is to be avoided. The foregoing series presents two remarkable cases—one in which the popliteal skin gave way under excessive traction; antiseptic treatment was promptly adopted, and the case eventually did well. The other was a fatal case, death having been caused in a feeble unhealthy subject by shock resulting from forcible stretching of the knee-joint, the other joint having been similarly treated a few days previously, with the result of producing a smart attack of fever. Both joints were found to contain bloody synovium, and ecchymoses were observed outside of them; but no evidence of inflammation existed on either side.

Antiseptic incision of joints.

The excellent practice of incising joints with antiseptic precautions for the purpose of relieving tension and evacuating matter is exemplified by five cases in which the knee-joint was opened and drained; with the result of giving immediate relief and establishing permanent cure. This practice is one of the most brilliant and useful results of Professor Lister's system. The pernicious element of tension is always present to a greater or less extent in joint disease. It may be caused by accumulation of liquid material inside the joint cavity, or by the aggregation of morbid products outside of it; these products invariably possessing greater bulk than the healthy tissues, and being formed or deposited in the midst of rigid and unyielding materials. The effects of tension so caused vary, as in the instance of pressure, according to its degree and duration, producing either pain and functional disturbance, alteration of nutrition, suppuration, or tissue death, according to its intensity. The conspicuous benefits derived from incision are mainly

Tension in joint disease.

Effects vary according to intensity and duration.

due to relief of tension, and the advantage of resection is probably also in great measure dependent on the same principle. In no case was it found necessary to scrape morbid material from the joint surfaces, as Sir Joseph Lister is in the habit of doing with signal success in cases of strumous joint disease. The operation of resection was rendered necessary in four cases—two elbows and two hips—by the effects of severe injury; and in the remaining five—three elbows and two knees—by destructive disease of an acute kind. The fatal case of excision of the elbow was pyæmic to start with, and death was due to septic osteomyelitis. In case 5. c. i. the wiring together of the divided ends of the femur and tibia contributed to the comfort of the patient and accelerated recovery. I am informed by Sir Joseph Lister that he has pursued this practice with unquestionable advantage for many years.

CHAP. VI.

Incision and
resection re-
lieve tension.Cases of resec-
tion.Wiring of
bones in re-
section.

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CHAPTER VII.

OPERATIONS ON BONES.

IV. 1. PARTIAL EXCISION FOR NECROSIS (SEQUESTROTOMY).

Syphilitic
necrosis of
frontal bone.

i. **Frontal Bone.**—Hebrew male, æt. 30. Syphilitic necrosis of frontal bone. Sinus slit open and sequestrum removed. Wound cicatrized soundly after nearly eight months' treatment.

Necrosis of
lower jaw.

ii. **Lower Jaw.**—Hindu male, æt. 40. Fourteen months ago he had suppuration of the gums on the left side. A month afterwards a swelling appeared near the angle of the lower jaw on the same side; it burst and formed into a sinus. Another sinus formed soon after in the same situation. Both of them led to bare bone. Took mercury for rheumatism.

Sequestro-
tomy.

After admission the opening (lowermost) was enlarged, and almost the whole of the left ramus of the lower jaw removed in pieces. The wound healed up by granulation. Discharged in 81 days, cured.

Recovery.

Necrosis of
lower jaw.

Sequestro-
tomy.

Erysipelas.

Recovery.

iii. Hindu male, æt. 20. Sinus of right cheek, leading to necrosed alveolar process holding two loose dead teeth; necrosed teeth and bone removed and edges of sinus brought together. A severe attack of facial erysipelas followed. The wound became sloughy and gaped. Recovery took place, and he eventually left hospital with a sound jaw and contracted sinus.

Necrosis of
lower jaw.

iv. Hindu male, æt. 30. Had a gumboil about a year and a half ago, which burst. He was profusely salivated, and matter made its way out through an opening opposite the angle of the jaw. On admission the right half of the lower jaw was found necrosed from symphysis to angle, the sequestrum was loose, and a new body had been formed. The dead piece was easily removed by manipulation. It was 4 inches long and $1\frac{1}{4}$ inch deep. The teeth had dropped

Sequestro-
tomy.

out, and the alveolar sockets had been ground down by rubbing against the teeth of the upper jaw. The cavity soon filled up and the sinus closed. He was discharged six days after operation. CHAP. VII.
IV. 1.
Recovery.

v. Hindu male, æt. 30. Had a bad gumboil on the left side of the lower jaw a year ago; lost two molars. Twenty days ago an opening was made externally, through which a piece of dead bone was extracted. On admission, loose sequestra could be detected through the sinus. This was enlarged under chloroform, and three pieces of dead bone were extracted. The mouth was subsequently opened by repeated use of Smith's gag. Got an attack of facial erysipelas three weeks after operation. On subsidence of this the cavity and sinus closed, and he was discharged after a stay of 30 days in hospital. Necrosis of lower jaw.

Sequestro-
tomy.

Erysipelas.

Recovery.

vi. Hindu male, æt. 20. Exfoliation of right ramus of lower jaw caused by a strumous abscess of the cheek of three months' standing. Several sinuses existed on the right side of the face and neck. These were laid open and scraped. The sinus leading to the dead bone was also enlarged, a lot of gelatinous granulation material scraped out, some small exfoliations were removed, and the surface of the diseased bone well filed down by an osteotrite. Constitutional treatment was adopted. The sinuses healed soundly by granulation. The mouth was opened by repeated use of Smith's gag. Remained 53 days in hospital. Necrosis of lower jaw.

Sequestro-
tomy.

Recovery.

vii. Humerus.—Hindu male, æt. 35. History of syphilis; admitted with sinus of left shoulder leading to dead bone. Sequestrum, which consisted of the greater part of the head of the humerus, was removed, and patient left hospital in two and a half months with a depressed cicatrix and some what impaired movements of the shoulder-joint. Necrosis of humerus.

Sequestro-
tomy.

Recovery.

viii. Hindu male, æt. 18. Upper two-thirds of apophysis of right humerus necrosed, consequent on an abscess which occurred a year ago. Four sinuses led to dead bone. They were laid open, the cloaca enlarged, and sequestrum (5 inches long) removed; wound purified with chloride of zinc, and dressed antiseptically. Two sinuses remained, whose mouths contracted. These were again laid open and the wound treated for granulation. Arm much shorter than the opposite; bone firm; shoulder-joint somewhat stiff; discharge light and serous; health greatly improved. Necrosis of humerus.

Sequestro-
tomy.

Recovery.

CHAP. VII.	ix. Hindu male, æt. 25. Had an abscess of right arm six years ago, which has never closed. Numerous subcutaneous abscesses appeared on other parts of his body, which healed after discharge of matter. Moveable dead bone detected through the sinus of arm. This was enlarged under chloro-
IV. 1.	form, and two sequestra removed—one 2 inches long. A drainage tube was inserted, and the wound dressed antiseptically. The sinus healed soundly. He had an attack of dysentery during convalescence. Discharged in 45 days.
Necrosis of humerus.	x. Radius and Ulna.—Hindu boy, æt. 8. Fell from a height of about 20 feet; sustained compound fracture of lower end of left humerus, and also of radius and ulna of the same side a little above the wrist. The wound of the arm healed up without much difficulty. Necrosed pieces of radius and ulna about an inch in length removed about six weeks after the accident. Discharged with a stiff elbow after 164 days.
Sequestro-	
tomy.	
Recovery.	
Necrosis of radius and ulna.	xi. Ulna.—Hindu male, æt. 32. Death of a large portion of the right ulna, consequent on compound fracture. Sequestrum 4 inches long removed. Discharged in 37 days with wound soundly healed, but rather impaired movements of the hand.
Sequestro-	
tomy.	
Recovery.	
Ditto.	xii. Native Christian female, æt. 36. History of abscess two months before admission. Sinus laid open; several dead bits of left ulna removed; wound healed up in 54 days.
Necrosis of femur.	xiii. Femur.—Hindu male, æt. 30. Compound comminuted fracture, one month before admission, of lower third of femur. Lower fragment drawn behind and within upper, the end of which protruded through the skin outside of the knee-joint. Masses of dead femur removed, bone refractured and placed in better position. The wound was putrid on admission, and continued so after operation, though an attempt was made to render it aseptic.
Sequestro-	
tomy.	
Extension of disease.	Septic suppuration with severe constitutional disturbance set in, which eventually implicated the knee-joint, rendering amputation of the thigh necessary. This operation was performed by Dr. Raye, under whose care the case came, and I understand that though the man was reduced to a state of extreme prostration before operation, he rallied to some extent, but eventually succumbed, having survived the amputation over a week.
Amputation.	
Death.	

- xiv. **Tibia, &c.**—Hindu male, æt. 8 (*vide* III. 5. a. iii.). CHAP. VII.
 Necrosis of shaft of right tibia and fibula and left fibula, IV. 1.
 following small-pox consequent on inoculation four years ago. Necrosis of
 Sequestra removed, cavities scraped out and purified with chlo- tibia, &c.
 ride of zinc (40 grs. to 1 oz.); wounds dressed antiseptically; Sequestro-
 wounds remained aseptic and healed rapidly by granulation. tomy.
Recovery.
- xv. Mahomedan male, æt. 20; two and a half years' dura- Necrosis of
 tion, consequent on abscess. Sequestrum was removed tibia.
 from lower end of right tibia and wound healed soundly Sequestro-
 in 87 days. Ankle-joint a little stiff. tomy.
Recovery.
- xvi. Hindu male, æt. 22. Caused by abscess thirteen Ditto.
 months ago. Sequestrum removed from lower end of left
 tibia; wound cicatrized in 130 days.
- xvii. **Tarsus.**—Armenian female, æt. 40; one and Necrosis of
 a half year's duration. Idiopathic inflammation resulting tarsus.
 in abscess. Several sinuses of left foot leading to bare Resection.
 bone; carious bones (scaphoid, internal cuneiform and base
 of first metatarsal) removed. Cavity filled up very slowly.
 Left hospital eventually in $7\frac{1}{2}$ months with a soundly Recovery.
 cicatrized wound and able to walk.
- xviii. Hindu male, æt. 38; disease of eighteen months' dura- Necrosis of
 tion; contusion followed by abscess. Four sinuses of right tarsus.
 foot leading to bare bone. Incisions made along inner and Watson's
 outer borders of foot; periosteum detached; scaphoid, operation.
 cuboid, three cuneiforms, and bases of metatarsal bones
 removed (P. H. Watson's operation). The wound filled up,
 but a sinus remained, and bare bone being still detected, Failure.
 amputation at the ankle-joint was performed $3\frac{1}{2}$ months Amputation.
 after resection.
- xix. Hindu male, æt. 35. Disease of six months' dura- Necrosis of
 tion, caused by injury. Internal cuneiform and tarsal tarsus.
 end of first metatarsal bone removed. Healed up soundly in Resection.
 55 days. Recovery.

2. PARTIAL EXCISION FOR CARIES.

- i. **Os calcis.**—Hindu male, æt. 25. Caries of os calcis of Caries of os
 four months' duration. History of abscess followed by sinuses, calcis.
 which were found to lead to a carious cavity. Sinuses con-
 nected by incision; carious bone thoroughly removed by
 gouge, chisel and hammer, and osteotrite; sinuses scraped Gouging.

- CHAP. VII.**
IV. 2. 3.
- Recovery.** and cavity dressed antiseptically with boracic gauze. Remained aseptic. Sinuses had to be enlarged on two subsequent occasions for the extraction of fragments of bone. The cavity finally healed up soundly after 170 days' residence in hospital.
- Caries of os calcis and cuboid.** ii. East Indian, æt. 18. Caries of os calcis and cuboid of six months' standing. Three sinuses on the outer border of foot leading down to carious bone; cavity exposed by free incision and carious material thoroughly extirpated, sinuses scraped out, wound washed with chloride of zinc (40 grs. to 3i), and dressed antiseptically. Cavity filled up with granulation material, and wound healed without further operation.
- Gouging.** Left hospital with a sound, useful, though somewhat deformed foot, in 111 days.
- Recovery.** iii. Mahomedan male, æt. 28; wounded by nail in left heel four months before admission. Inflammation ensued, resulting in sinus leading down to carious bone. The sinus was laid freely open, and the carious bone scooped out by means of a gouge. The wound was dressed antiseptically, a layer of boracic gauze being invaginated, and loosely stuffed with carbolic gauze. Repair by granulation took place, and he left hospital with a sound heel after a stay of 60 days.
- Caries of os calcis.** iv. Hindu male, æt. 30. A nail entered above his right heel, and though it was extracted at once, inflammation and suppuration followed, requiring three successive incisions—over the tendo Achillis, at the lower third of the leg, and on the sole. After a month it was discovered that the os calcis was carious. It was exposed by longitudinal incision, and about two-thirds of it gouged out. 171 days after operation, the old sinuses still remained open, and a new gathering formed over the instep. The cavity of the operation wound had not closed. The ankle was swollen, but the joint moveable. He had improved in health, but disease of the tarsus still existed, and amputation was strongly pressed on the patient, to which he would not give his consent.
- Incisions.**
- Gouging.**
- Extension of disease.**
- Simple fracture of patella.** 3. i. Wire Suturing of Fractured Patella.—European male, æt. 50. Sustained transverse fracture of the right patella, and was treated for fourteen days by hyper-extension and strapping. The fragments could not be maintained in

contact; they were exposed by two vertical parallel incisions about an inch apart, drilled with a bradawl, and brought close together by means of a double twisted silver wire, a large quantity of clot having been cleared out with the finger from between them. The wounds were stitched with iron wire and horse-hair. The operation was performed under strict antiseptic precautions. The wound remained aseptic throughout, and pursued an aseptic course. The wires were untwisted and removed 40 days after the operation. There was a slight rise of temperature for two days, and some tenderness of the wound, but no inflammation or suppuration occurred.

CHAP. VII.

IV. 3.

Wiring of
fragments.

Recovery

Refracture.

Recovery.

Simple frac-
ture of patella.

Suppuration.

Recovery.

The bone united firmly, and patient left hospital in 102 days, with a useful joint and limb. He subsequently fell down some steps, and refractured the bone at the same site. The fracture on this occasion was compound, owing to the tearing open of the wound. He was treated at the General Hospital. The wound closed and the bone united, with the exception that a small fragment at the upper and outer aspect of it remained detached from the rest of the mass. He was seen walking about, without difficulty or halt, some months after the second operation. (See the *Indian Medical Gazette*, vol. xvii., 1882, p. 137.)

ii. Hindu male, æt. 40. Sustained transverse fracture of the right patella by a fall on the knee while in a bent position. The joint was much swollen, and the fragments remained $1\frac{1}{2}$ inches apart, and could not be brought closer. A single vertical incision was made, large clots cleared out of the joint and the cavity of the fracture. The fragments were then drilled and approximated by twisted silver sutures. The operation was performed under strict antiseptic precautions, but symptoms of carbolic poisoning set in; the carbolic dressings were exchanged for boracic; putrefaction invaded the wound and joint, which suppurated. Drainage tubes were inserted; the wires were withdrawn after 49 and 58 days; the wound eventually closed, the bone united, and patient left hospital in 132 days, able to walk fairly well with the aid of crutches. He has been lost sight of.

The first of these cases seemed at first to be a perfect success, but the accident of refracture, which

CHAP. VII.

IV. 4.

Remarks on
wiring patella.

has been repeatedly recorded in similar cases, delayed the cure, which was eventually satisfactory. In the second case the occurrence of carbolic poisoning and subsequent putrefaction of the wound militated against success. The result, as observed when he left hospital, was not very gratifying, and the lame stiff joint, which served the purpose of progression very indifferently, was a somewhat disappointing outcome of much suffering and long confinement to bed on the part of the patient, and great anxiety and labour on the part of his attendants.

Obliquely
united fracture
of femur.

4. Refracture of the Femur.—Hindu male, æt. 30.

Had sustained a fracture of the middle of the right femur three months ago. It was unskilfully treated, and united at a considerable angle. The limb was 3 inches shorter than the other, and walking was accomplished with great difficulty and distress. He was put under chloroform, and traction was made in opposite direction by means of three folded sheets, the central being placed over the seat of fracture and pulled towards the bend. The callus gave way, and by manipulation all deformity was corrected. He was kept for a month on a long splint, and after 37 days' stay in hospital was able to walk comfortably. One inch of shortening remained. He had no constitutional disturbance after the operation.

Refracture.

Recovery.

Diseases of
bones very
common in
India.

Comment.—Bone disease is very frequently seen in hospital and dispensary practice in India; but, as in the case of joints, it is in the great majority of cases due to injury or the result of acute inflammation—very seldom caused by slow and chronic inflammatory change of a strumous or tubercular kind. The notes of the 23 cases in which removal of necrosed or carious bone was found necessary, fully bear out this general statement, which is also founded on what I have observed in practice among natives. Acute epiphysitis and periostitis, resulting in death of large masses of bone, are very common. Reference will be made when discussing the subject of abscess to the great

Kinds and
causes most
frequently met
with.

proneness of the natives of Bengal to suppurative inflammation, which is often a complication or sequel to the severe fevers of malarial type to which they are subject. The suppuration is frequently situated in these cases beneath the fibrous layer of the periosteum of both round and flat bones, and of very rapid progress and diffuse kind. When early recourse is had to free incision, the bone, though extensively stripped, survives; but when delay occurs, as too frequently happens, extensive necrosis and tedious exfoliation are the inevitable consequence. Syphilis and mercury, either separately or in conjunction, are responsible for a good deal of bone disease in India; but, as has been already stated, not so much as, reasoning from European experience, might be expected. The operations above recorded were performed in accordance with the usual principles and methods. Although sinuses existed in all cases, the use of chloride of zinc and antiseptic dressings (boracic lint and carbolic gauze) was found to be of great service in extirpating and preventing putrefaction and accelerating repair.

CHAP. VII.

Suppurative
periostitis.Syphilis and
mercury.

I have never met with a case of rickets in a native subject, nor seen any deformity attributable to that disease. Cases of mollities ossium are also extremely rare among natives of India.

Rickets and
mollities
ossium very
rare among
natives.

CHAPTER VIII.

AMPUTATIONS.

Cases, 61; Deaths, 16.

A. AMPUTATIONS FOR INJURY.

Cases, 38; Deaths, 9.

- Machinery accident.** V.A. 1. **Primary, through Shoulder-joint.**—i. Mahomedan male, æt. 32. Severe machinery accident. Right arm and forearm thoroughly smashed. Amputation (primary) at shoulder-joint, flaps external and internal cut from without. Elastic cord did not command axillary sufficiently. A good deal of bleeding in consequence. Died of shock in two days.
- Amputation at shoulder.** ii. Male Mahomedan, æt. 13. Sustained a severe laceration of right arm in the machinery of a jute-mill a few hours before admission. An Esmarch's cord was wound tightly round the shoulder, and kept in position by tapes fastened on the opposite side. The remains of the arm were taken off at the shoulder-joint. Anterior and posterior flaps were cut; the latter larger. Little or no blood was lost, and strict antiseptic precautions were employed. Suppuration took place, and partial sloughing of posterior flap from bruising. A good stump eventually resulted. The wound healed partly by first intention and partly by granulation. There was no constitutional disturbance beyond the shock and reactive fever. Patient left hospital 90 days after the operation.
- Death.**
- Machinery accident.** 2. **Primary Amputation of the Arm.**—i. Hindu male, æt. 28. Machine accident. Sustained also lacerated wound of right leg. Arm removed before admission a few inches below shoulder-joint. Flaps a good deal bruised and torn; sloughed partially, exposing end of bone; wound healed by granulation. No necrosis. Left hospital with a sound stump in 74 days. Amputation wound became septic for a time. Wound of leg remained aseptic, and healed kindly and rapidly.
- Amputation at shoulder.**
- Recovery.**
- Machinery accident.**
- Amputation of arm.**
- Recovery.**

ii. Hindu male, æt. 15. Fell from a mango tree three days before admission. Sustained simple Colles's fracture of both radii, compound fracture of lower end of right humerus and olecranon process. Right forearm much swollen and infiltrated; gangrene evidently impending. Amputation by modified circular method—oval skin flaps and circular division of muscles—of lower third of arm, under antiseptic precautions. Had fever and swelling of right knee for ten days. Some sloughing occurred in amputation wound, which granulated and healed within a month. Fracture of left radius underwent satisfactory union. Remained in hospital for 44 days.

CHAP. VIII.
V. A. 2-4.
Fall from a tree.

Amputation of arm.

Recovery.

3. Primary of Forearm.—i. Hindu male, æt. 36. Hand smashed by machinery; forearm lacerated and partially decorticated; primary amputation of forearm—middle—antiseptic. Recovered; discharged in 34 days.

Machine accident.

Amputation of forearm.
Recovery.

ii. Hindu female, æt. 36. Jute-mill accident; wrist, hand, and lower part of forearm completely smashed; primary amputation at middle of forearm. Recovered; discharged in 25 days.

Ditto.

Both these operations were performed under strict antiseptic precautions. Case ii. presented a typical aseptic result—absence of inflammation, suppuration, putrefaction, and constitutional disturbance, and union of the flaps by first intention. In case i. part of one of the flaps sloughed in consequence of original bruising, but the progress was satisfactory notwithstanding, and repair of the amputation wound rapid.

Typical aseptic result.

iii. Mahomedan male, æt. 14. Bitten by a horse five hours before admission. Right forearm completely crushed. Amputation performed at junction of upper and middle thirds, bloodlessly and antiseptically. Catgut threads used for drainage secured by catgut loops to deepest part of wound. Stitches removed and wound healed soundly in ten days. No constitutional disturbance of any kind, nor local inflammation or suppuration. Left hospital 26 days after operation.

Horse bite.

Amputation of forearm.

Recovery.

4. Primary, of parts of the Hand.—i. A native male,

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V. A. 4.

Smash of
hand.
Amputation of
fingers.

æt. 27. Came in with smash of index, middle and right fingers, and lacerated wound of the hand both on the dorsal and palmar aspects, and also of the thumb, its metacarpophalangeal joint being exposed. The ring finger was amputated through its middle phalanx; the middle finger through its metacarpophalangeal joint, and the index finger through the metacarpal bone. The operation was performed under chloroform, with antiseptic precautions. The result was satisfactory, and patient was discharged after 39 days with a stiff thumb.

Recovery.

Machine
accident.

iii. A Hindustanee lad, æt. 10, while working with a straw-cutting machine, injured his hand. There was compound dislocation of the first phalanx of the index finger and second phalanx of the middle. Extensive laceration of the soft structures; a longitudinal lacerated wound on the ball of the thumb, the metacarpophalangeal joint being exposed.

Amputation of
fingers.

The index and middle fingers were removed, with the greater part of the metacarpal bones, under chloroform. The thumb, ring and little fingers were saved. Discharged after two months with a useful hand.

Recovery.

Machine
accident.

iii. A Mahomedan male, æt. 30. Right hand caught between the wheels of an oil-machine. The index finger almost entirely divided just at its middle, and its metacarpal bone fractured. The middle finger pulverized. The metacarpal bone of the ring finger was fractured, and there were lacerated wounds situated on the dorsal and palmar aspects of the hand communicating with the seat of fracture; slight cut on the finger.

Amputation of
fingers.

The half of the index and whole of the middle fingers were removed under chloroform.

Recovery.

The patient absconded after a month, the wounds being quite superficial.

Machine
accident.

Amputation of
fingers.

iv. A Mahomedan adult male, æt. 26. The two distal phalanges of the index and middle fingers crushed by a machine. There was also a lacerated wound on the dorsum of the hand. The first phalanges of the fingers were saved. Discharged after 34 days with slight power over the stumps.

Recovery.

Amputation of
thumb.

v. A Mahomedan adult, æt. 35. Thumb entangled in a pulley and smashed. The phalanges removed under chloroform. Recovered.

vi. Hindu male, æt. 18. Machine accident; wound sloughy and putrid. Ring and middle finger removed at metacarpo-phalangeal joints. Healed by granulation. Putrefaction extirpated. Left hospital in 30 days.

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V. A. 4. 5.

Amputation of fingers.

Recovery.

vii. Hindu male, æt. 32. Compound comminuted fracture with great laceration of soft parts; occurred two and a half hours before admission. Ring and little fingers removed with metacarpal bones, which were divided half an inch from proximal end; catgut drains and horse-hair stitches. Flaps sloughed, but on separation, wound granulated kindly and healed in two months.

Amputation of fingers.

Recovery.

viii. Hindu male, æt. 12, sustained a severe lacerated wound of the right hand in the machinery of a jute-mill. All the fingers had to be removed with exception of the thumb and index finger; the palm was lacerated, and a skin covering could not be obtained for it. The operation was performed antiseptically, and repair took place quickly and satisfactorily. The thumb and index finger retained free motion, and a very useful hand remained. He was discharged after a stay in hospital of 46 days.

Amputation of fingers.

Recovery.

ix. Hindu male, æt. 35. Fingers of right hand crushed by a bone-crushing machine. Middle and ring fingers removed at metacarpo-phalangeal joint, index and little fingers at the base of the second phalanx. Operation followed by high fever and erysipelatous inflammation reaching as far as the axilla. This subsided, and was followed by dysentery, which resisted treatment, and caused death by exhaustion 25 days after the operation.

Amputation of fingers.

Erysipelas.

Dysentery.
Death.

x. Spaniard, æt. 42. Right middle and ring fingers smashed. They were amputated at the base of the second phalanx; wound healed by granulation. Had three attacks of hæmoptysis (he suffered from chronic phthisis) during convalescence. Discharged 45 days after operation.

Amputation of fingers.

Recovery.

5. Primary, of the Thigh.—Hindu female, æt. 40. Fell from a roof 22 ft. high. Colles's fracture of right wrist; compound comminuted fracture of left femur; fracture of lower jaw; concussion. Amputation (primary) by modified circular method at lower third of thigh. Died in three days of exhaustion.

Amputation of thigh.

Death.

Full details of this case, which presented many

CHAP. VIII. points of special interest, will be found in the Sep-
 V. A. 6. tember (1879) number of the *Indian Medical Gazette*.

Crush of leg. 6. **Primary Amputation of the Leg.**—i. Mahomedan male, æt. 34. Right leg crushed by fall of a bale of jute.
Amputation. Amputated at seat of election by modified circular plan. Wound putrefied; flaps sloughed; some secondary hæmorrhage occurred; suffered from severe constitutional disturbance; sloughs separated; remains of posterior flap dragged over end of bone. Satisfactory stump resulted in three months.
Recovery.

Crush of leg. ii. Mahomedan male, æt. 30. Sustained a crush of left leg, smashing the bones and lacerating and bruising the soft parts. Occurred eighteen hours before admission. Had suffered from shock, and showed symptoms of febrile reaction. An attempt was made to save the limb by rest and antiseptics, but in two days the parts became gangrenous and constitutional disturbance serious. Amputation by the modified circular method was performed at the "seat of election." The flaps were infiltrated and the wound was left open; boracic dressings used. He suffered from fever and bronchitis for a fortnight. Part of the posterior flap sloughed. Eventually the cavity was filled with granulations, and the skin edges drawn together by cicatrization. An excellent stump resulted. He was detained for 139 days in hospital.
Gangrene.
Amputation.
Recovery

Crush of foot. 7. **Primary Amputation above the Ankle-joint** (Syme's).—Mahomedan male, æt. 12. Right foot crushed four hours before admission; bones broken and dislocated, and soft parts stripped and lacerated. Lacerated wound of scalp over occipital bone. Flap obtained from heel and inner side of foot. Bones divided above malleoli; performed under strict antiseptic precautions. There was considerable reaction, and temperature continued high (100° to 102°); wound remained aseptic, and no local inflammation or supuration arose. Symptoms of tetanus appeared seven days after operation; the disease assumed a very acute type, and proved fatal in 24 hours.
Syme's amputation.
Tetanus.

Death. 8. **Primary, of Toes.**—i. Hindu male, æt. 35. Right great toe smashed and dorsum of toe lacerated by the fall of a heavy weight. Amputation performed at the metatarsophalangeal joint. Wound healed by granulation in 32 days.
Smash of great toe.
Amputation.
Recovery.

ii. East Indian male, æt. 45. Four outer toes of left foot smashed by the fall of a piece of sheet-iron, which almost detached them. Amputation was performed at the meta-tarso-phalangeal joints, and the wound allowed to heal by granulation, as the flaps were short and bruised. Discharged with a sound and useful foot in 121 days.

CHAP. VIII.
V. A. 9-12.
Injury of foot.
Amputation of
toes.

9. Secondary, through Shoulder-joint for Spreading Traumatic Gangrene.—Hindu female, æt. 32. Sustained a fall off a terrace four days before admission, resulting in compound fracture of both bones of the forearm; the whole arm had become gangrenous as high as the shoulder, and patient was in a very low state. Amputation was performed through the shoulder-joint, as offering the only chance of recovery. Hæmorrhage was restrained by the use of an elastic cord. No reaction took place. Symptoms of tetanus appeared next morning, and she died about midnight—39 hours after operation. The cut surfaces had been coated with lymph.

Spreading
traumatic gan-
grene from
fall.
Amputation.
Tetanus.
Death.

10. Secondary, of the Arm for Severe Burn.—Hindu female, æt. 18. Fell into the fire a month before admission, in a fit. Amputation through middle of arm. Recovered. Discharged in 51 days. (Dr. Palmer.)

Severe burn.
Amputation.
Recovery.

11. Secondary Amputation of Arm for Gangrene.—Hindu male, æt. 12.⁹ Fell from a mango tree eleven days before admission, and broke right forearm, which mortified. Line of demarcation had formed. Amputated at junction of middle and lower thirds by modified circular method, bloodlessly and antiseptically; catgut drain used. Wound healed up in six days and stump became round and solid in three weeks; no constitutional or local disturbance. Discharged twenty days after operation.

Gangrene from
fall.
Amputation.
Recovery.

12. Secondary Amputation of the Arm for Necrosis.—Hindu female, æt. 25. Left forearm bitten off by an alligator a few days before admission. Wound sloughy and full of maggots. Under treatment the sloughs separated, and healthy granulations appeared. A portion of the ulna remained, and an effort was made to save what was left of the forearm. She suffered from septicæmia and tetanus, which nearly killed her. Eventually the face of the stump healed, but several sinuses remained at the elbow, leading down to bare bone. A semilunar incision was made in

Alligator bite.
Septicæmia
and tetanus.

CHAP. VIII.

V. A. 13-15.

Recovery.

front, the remains of the ulna removed and about an inch of humerus. The wound healed kindly, and she left hospital, in good health and with a sound stump, 211 days after admission and 60 days after the operation.

Alligator bite of forearm.

13. **Secondary, of Arm, for Alligator Bite.**—Mahomedan male, æt. 50. His left forearm had almost been bitten off by an alligator about two months before admission. The wound had got covered with granulations, and large masses of callus had formed, but the part was riddled with sinuses and the tissues swollen by inflammatory infiltration. He had subacute trismus and slight fever. He was kept under observation for six days; and no prospect of recovery with a useful limb existing, amputation was performed through the elbow-joint, a circular division of the soft tissues having been made 2 inches below it. The wound pursued an aseptic course, and he was discharged well in 39 days.

Amputation.

Recovery.

Crush of forearm.

14. **Secondary, of the Forearm for Gangrene.**—Hindu male, æt. 30. Left forearm crushed in a sugar-mill eleven days before admission. Both bones broken; tissues on anterior aspect of forearm gangrenous. Temperature 103°, pulse feeble; patient restless and delirious. Gangrenous tissues removed at line of demarcation with scissors. Oral flap cut from sound tissues on dorsum; bones divided 2 inches below elbow; vessels secured with catgut. Tissues in a state of inflammatory infiltration; great tendency to oozing, which was checked by catgut ligatures. Wound washed with chloride of zinc (40 grs. to 3i.) and dressed antiseptically. Secondary hæmorrhage occurred on two occasions in consequence of patient's restlessness. He became low, and sank fifteen hours after the operation.

Gangrene.

Amputation.

Hæmorrhage.

Death.

Sloughing ulcers.

15. **Secondary, of Thigh for Spreading Traumatic Gangrene.**—i. Hindu male, æt. 40. Sloughing ulcers of right foot, extending. History of syphilis, mercury, drink, and opium. Left leg amputated a few years ago for similar condition. Syme's amputation performed; gangrene set in (traumatic spreading.) Amputation above knee by long posterior and short anterior flap. Gangrene speedily supervened; death in three days.

Double amputation.

Gangrene.

Death.

Gangrene of leg from a kick.

ii. Hindu male, æt. 60. Sustained compound fracture of the upper third of left leg by the kick of a horse, twenty hours before admission. Next morning the whole leg was found

to be gangrenous. Temperature 102° , tongue dry. Carden's amputation was performed under strict antiseptic precautions. The knee-joint was found full of sanguineous serum, and the subcutaneous cellular tissue of the limb tensely infiltrated with the same. Patient sank fifteen hours after the operation. He never rallied, and death appeared to be due partly to shock and partly to septicæmia.

CHAP. VIII.
V. A. 16. 17.
Amputation.

Death by
shock.

16. Secondary Amputation of the Thigh for Gangrene.—i. Hindu male, æt. 22. Fell off a palm tree some days before admission and broke his left leg. Gangrene set in. There was a line of demarcation below the knee on admission. Putrid suppuration occurred in the knee-joint and constitutional disturbance was severe. Carden's amputation was performed, and the supra-patellar pouch, which had become greatly distended, was thoroughly scraped and washed out with a solution of chloride of zinc (40 grs. to an oz.) Notwithstanding strict antiseptic treatment, the wound putrefied, suppurated, and sloughed to a slight extent. It was nearly healed in six weeks, when secondary hæmorrhage from the popliteal artery occurred, for which the femoral artery was tied with catgut below Hunter's canal. This wound healed readily under antiseptic treatment. There was no return of bleeding, and the patient left hospital with a sound stump $7\frac{1}{2}$ days after operation.

Gangrene of
leg from fall.

Carden's
amputation.

Hæmorrhage.

Ligature of
femoral.

Recovery.

ii. Mahomedan, æt. 26. Sustained a compound fracture of the lower third of the leg by the wheel of a carriage passing over it. Gangrene set in on the third day, and the limb was removed by Carden's amputation under strict antiseptic precautions. The anterior flap was infiltrated with sanguineous serum, and the thigh swelled and the inguinal glands became irritated. The discharge was copious and grumous for a few days, and considerable constitutional disturbance existed. The wound remained aseptic and underwent repair by first intention. An excellent stump resulted. Stitches were removed in from four to twelve days, and catgut was used for drainage, and proved efficient; no suppuration occurred. The patient was discharged in 58 days, able to walk with the aid of an artificial leg.

Gangrene from
wheel injury.

Carden's
amputation.

Recovery.

17. Secondary Amputation of Thigh for Compound Fracture and Hæmorrhage from Eroded Popliteal Artery.—Hindu male, æt. 43. Admitted 29th November

- CHAP. VIII.
V. A. 18, 19.
Erosion of
popliteal artery
from compound
fracture.
- Carden's
amputation.
Spreading
gangrene.
Death.
- Crush of foot.
- Amputation.
- Recovery.
- Crush of foot.
- Syme's
amputation.
- Recovery.
- Crush of foot.
- Syme's
amputation.
- with compound comminuted fracture of left femur above the condyles; wound was in course of repair when, on the 31st December, free arterial hæmorrhage occurred. This was controlled by graduated compress, but was repeated on three subsequent occasions, greatly reducing patient's strength. It became evident that the blood proceeded from the main artery, and amputation was resorted to as the only means of saving life; the bleeding point being very deep, and the prospect of gangrene certain if the main artery of the limb were ligated. The amputation was performed by Carden's method, bloodlessly and antiseptically. The stump became gangrenous within 24 hours; the gangrene spread rapidly, and death ensued on the second day after the operation. The popliteal artery was found to have been eroded by a sharp edge of the broken bone.
18. Secondary, of Leg for Disorganization of Ankle-joint.—Mahomedan male, æt. 45. Left foot and ankle severely bruised by the fall of bricks. Destructive inflammation ensued, resulting in disorganization of the ankle-joint. Amputation was performed, after a vain effort to save the limb, at the lower third of the leg, by the modified circular plan. The wound healed by first intention, and he left hospital with a sound stump 40 days after operation.
19. Secondary Amputation above the Ankle-joint (Syme's) for Gangrene.—i. Mahomedan male, æt. 40. Left foot crushed by the wheel of a trolley; foot became gangrenous after a week's stay in hospital. As much skin as remained alive saved; no stitches inserted. Operation performed antiseptically; wound remained sweet, and healed by granulation. The skin was dragged over the face of the stump during the process of cicatrization. This was aided by careful application of straps. A sound stump eventually resulted, which bore the weight of the body well. Patient discharged 127 days after the operation, able to walk with a high-heeled boot.
- ii. Hindu male, æt. 40; left foot severely crushed by the wheel of a cart. Extensive suppuration and sloughing, with severe constitutional symptoms, set in in a few days, and amputation became necessary to save both life and limb. Syme's incisions were followed as closely as the state of parts permitted. The heel flap sloughed in a few days, and a

gangrenous abscess formed in the calf, spreading up along the tendo Achillis. A free counter-opening was made; the abscess healed, the wound became clean, and sufficient skin remained to cover the stump. The process of repair was protracted. He left hospital after a stay of 117 days in good health, and able to walk with a high-heeled boot. CHAP. VIII.
V. A. 20-22.
Recovery.

20. **Secondary Amputation of the Great Toe.**—Hindu male, æt. 30. Sustained a severe lacerated wound of the sole of left foot by the fall of an iron bar on it six months before admission. Great toe pulled down and fixed at right angles to sole of foot by cicatricial contraction. It was removed at the metatarso-phalangeal joint. The wound healed by granulation in 89 days. Patient left hospital with a useful foot. Malposition of
great toe.
Amputation.
Recovery.

B. AMPUTATIONS FOR DISEASE.

Cases, 23 ; Deaths, 7.

21. **Amputation of the Upper Extremity and Scapula for Sarcoma.**—Hindu male, æt. 20. Sustained a fracture of right humerus near the shoulder in infancy. The upper part of the arm began to swell painfully three months ago, and the tumour has grown very rapidly. It was punctured twice, but nothing issued except sanguineous fluid. It is a diffuse fluctuating swelling, occupying the upper half of the arm, and measuring 27 inches in circumference. Patient emaciated and pallid; suffering great distress and subject to fever. The tumour was removed by amputation of the upper extremity, including the scapula and outer half of the clavicle. He died of shock about an hour after completion of the operation. On post-mortem examination, recent infarctions were found in both lungs. The tumour was a very soft diffuse sarcoma. Full details will be found in the January (1884) number of the *Indian Medical Gazette*. Immense soft
sarcoma of arm
and shoulder.
Amputation.
Death from
shock.

22. **Amputation at Shoulder-joint for Sarcoma of Arm.**—Hindu male, æt. 19. Eight months' duration, 16 inches in circumference. Amputation through shoulder-joint by external and internal oval flaps. Esmarch's cord used. Operation performed under strict antiseptic precautions. No secondary fever; wound remained sweet, and Sarcoma of
arm.
Amputation.
Recovery.

- CHAP. VIII. healed for most part by first intention. Discharged 32 days after operation.
- V. B. 23-27.
- Epithelioma of arm. 23. **Of the Arm for Epithelioma.**—Hindu male, æt. 42. Severe burn of left arm and forearm at six years of age; epithelioma commenced two years ago, involved periosteum of inner condyle and fascia covering origins of muscles. Amputation antiseptically of lower third of arm by modified circular plan. Healed by primary adhesion. Discharged in eighteen days. This amputation pursued a typical antiseptic course, notwithstanding that, owing to tight bandaging, the stump cavity became distended with venous blood, and it was necessary on the third day to open the wound and remove the clots, which were creating tension and some constitutional disturbance; this disappeared immediately on removal of the tension.
- Amputation.
- Recovery.
- Sarcoma of forearm. 24. **Amputation of the Arm for Sarcoma of Forearm.**—Hindu female, aged $2\frac{1}{2}$ years. Disease of eleven months' duration; whole of right forearm from elbow to wrist involved. Amputation by modified circular plan at lower third of arm, bloodlessly and antiseptically; catgut drain used. Treated as an out-door patient. Dressed on 2nd, 4th, 7th, 10th and 14th days; wound remained sweet, and united throughout by first intention. Very little constitutional disturbance.
- Amputation.
- Recovery.
- Epithelioma of wrist. 25. **For Malignant Disease of the Forearm.**—Hindu male, æt. 50. Epithelioma of wrist following injury sustained one year ago. Amputation by modified circular at upper third of forearm; antiseptic; primary union. Discharged in 25 days.
- Amputation.
- Recovery.
- Necrosis of finger. 26. **Amputation of the Right Middle Finger for Necrosis.**—Englishman, æt. 38. Had sustained a gun injury to the finger ten months before admission. First inter-phalangeal joint disorganized and adjoining bones necrosed; finger amputated through metacarpo-phalangeal joint by oval method. Satisfactory result in 29 days.
- Amputation.
- Recovery.
- Immense soft sarcoma of thigh. 27. **Amputation of the Lower Extremity and Bones of the Pelvis for Sarcoma.**—Hindu male, æt. 43. Sustained an injury of left hip three months ago, which was followed by a swelling which has undergone rapid increase of size. Admitted with an immense fluctuating enlargement of left thigh, measuring 24 inches in circumference; no pulsation. Patient emaciated, and suffering great distress.

from pain and fever. An exploratory incision was made, which revealed a large ragged cavity containing blood and surrounding the bare and eroded shaft of the femur. Amputation was performed at the hip-joint. The cortex of the hollow was found to consist of sarcoma. In order to extirpate it, it became necessary to remove by chisel, hammer, gouge, and bone forceps, the whole of the ischium and greater part of the ilium and pubis. Special precautions were taken to restrain hæmorrhage, and very little blood was lost. Patient died of shock five hours after completion of the operation. Secondary dissemination had taken place in the lungs, and the inguinal glands were diseased. The tumour was found to be a very soft sarcoma. the case has been fully detailed in the issue of the *Indian Medical Gazette* for January 1884.

CHAP. VIII.

V. B. 28, 29.

Amputation.

Death from shock.

This case, and case No. 21 above reported, are very good illustrations of diffuse rapidly growing sarcoma in young subjects, hollowed out by hæmorrhage and degeneration into large cavities, and simulating cyst or aneurism. These cases are very common in Bengal, and early secondary visceral deposit takes place, so that the propriety of operation is more than doubtful.

Remarks.

28. **Amputation of Thigh for Caries of Tibia and Tarsus.**—Hindu male, æt. 46. Had suffered for years from disease of bones of right leg and foot, causing profuse discharge and great prostration. Leg atrophied; general health very low. Carden's amputation performed bloodlessly and antiseptically. Caoutchouc tubes used for drainage. Constitutional disturbance after operation mild; wound healed soundly in 24 days; general health improved greatly. Discharged 79 days after operation.

Caries of leg and foot.

Carden's amputation.

Recovery.

29. **Amputation of Thigh for Disorganization of the Knee-joint.**—i. Hindu male, æt. 38. Disease of eight years' duration. Joint semi-flexed, grated on movement. Abscesses formed external to it. Suffered from fever of a low type (hectic); knee-joints filled with putrid pus. Amputation performed at middle of thigh by lateral flaps (to avoid putrid abscesses and sinuses), bloodlessly and antiseptically; inner flap larger. Caoutchouc tubes used for drainage; wound remained sweet, and healed mostly by first intention; considerable shock and reactive fever: general health

Disorganized knee-joint.

Amputation of thigh.

Recovery.

CHAP. VIII.

V. B. 29.

Disorganized
knee-joint.
Resection.

Failure.

Amputation.

Death.

Disorganized
knee.Carden's
amputation.

Death.

Disorganized
knee-joint.

improved rapidly. Patient left hospital 77 days after operation with a sound stump and in good health and condition.

ii. This patient had undergone resection of the knee-joint (III. 5. c. ii.). Amputation was resorted to for the purpose of removing the morbid tissues, which were in a state of suppurative inflammation, and so minimizing the profuse discharge which was giving rise to a rapidly exhausting hectic. The anterior flap of the resection wound was retained as the anterior flap of the amputation; the patella removed, the posterior flap cut by oblique incision through the popliteal space, and the femur divided above the condyles. The cavity of the resection wound was thus taken away. An abscess cavity running up the thigh, into which a counter-opening had been made below the trochanter, remained. The man was in a state of miserable debility, but bore the operation well. Very little blood was lost. He seemed at first to rally. No attempt at repair took place; discharge continued profuse; wasting and exhaustion progressive; and he died eight days after operation. The wound did not undergo putrefaction after either operation, and the suppurative melting away of the tissues seemed to be the result of sheer constitutional asthenia.

iii. A Hindu male, æt. 40. History of syphilis and mercury; an attack of fever two months ago succeeded by two abscesses of the right leg and right arm, which burst spontaneously. Both knees swelled, and the right leg became permanently flexed. General health bad. On exploring the right knee-joint it was found full of pus. It was laid open by incision, and found to be carious. Carden's operation was performed. A putrid sinus ran up the thigh. A counter-opening was made at its upper end, and a drainage tube inserted. No improvement followed the operation, and he sank of exhaustion, with pronounced symptoms of septic fever, ending in prostration, two days after the operation.

iv. Hindu male, æt. 40. Had suffered from inflammation of the left knee-joint for two years. Became more swollen and painful three weeks before admission; joint permanently flexed. It was straightened under chloroform, put on a McIntyre splint, and treated by counter-irritants locally, iodide of potassium being administered internally. Patient continued to suffer from fever and diarrhoea, which commenced before admission. On

exploration 3½ months after admission, the joint was found to be full of pus. It was opened and drained antiseptically; a large abscess formed at the back of the leg, and the joint was found to be disorganized and carious. The limb was removed by Carden's method. The diarrhoea meantime turned into dysentery. The wound remained aseptic, but the posterior flap melted away, and no attempt at repair took place. He rallied to some extent, but eventually sank from wasting and prostration 34 days after the operation.

CHAP. VIII.

V. B. 30-32.

Carden's amputation.

Death.

30. Amputation of Thigh for Open Aneurism.—Male Hindu, æt. 25. Circumstances necessitating amputation explained above (II. 1. e). Amputation at lower third of thigh by antero-posterior flaps, cut from without, and circular division of muscles; wound putrefied; small exfoliations came off end of femur. Left hospital 146 days after the amputation with a sound stump.

Open popliteal aneurism.

Amputation.

Recovery.

31. Amputation of Thigh for Osteo-Sarcoma of Leg.—Hindu male, æt. 18. Tumour of nine months' duration followed upon an injury; fungated ten days before admission; implicated the whole of the leg, which measured 21 inches in circumference. Skin tense, hot, glazed and tender; foot cedematous; inguinal glands enlarged; patient weak and anæmic. Amputation by Carden's method performed bloodlessly and antiseptically. Catgut drain inserted in front and behind end of bone, and brought out at the angles. Wound remained aseptic, and healed by first intention. There was no inflammation, suppuration, nor constitutional disturbance. Wire stitches removed in ten days and horse-hair in eighteen. The wound healed in eleven days, except at the corners where the drains emerged: these dropped off. Patient remained 62 days in hospital, until the stump was sufficiently callous to bear the weight of the body on an artificial limb. The tumour was found on examination to be an osteo-sarcoma originating in the head of the tibia.

Osteo-sarcoma of leg.

Carden's amputation.

Recovery.

32. Amputation of the Leg for Mycetoma of Foot.—Hindu male, æt. 34. Sustained an injury of the sole of left foot about a year before admission. A month after, a few pimples appeared near the wound, which suppurated and burst; successive crops of flesh pimples appeared, the foot and ankle meantime growing bulky. On admission, foot, ankle and lower third of leg found brawny and covered with button-like tubercles, through which a probe entered and

Mycetoma of foot.

- CHAP. VIII.
V. B. 33-34.
Amputation. passed deeply into the member. No bare bone could be felt. White granular material like hilsa roe could be spooned out of the sinuses. Amputation of leg at junction of middle and lower third performed bloodlessly and antiseptically by long anterior and short posterior flaps. Catgut drain used: wound remained aseptic, and healed by first intention. Drain fell off on seventh day; wire sutures removed on fifth and horse-hair on eleventh day. Wound soundly healed in fifteen days. Left hospital 54 days after operation. Able to walk comfortably on an artificial bottle leg.
- Recovery.
- Caries of leg. **33. Amputation of the Leg for Syphilitic Caries.**—Hindu male, æt. 30. Suffered from syphilis fourteen years ago; was salivated. An abscess formed over right tibia two years before admission, which burst and exposed the bone. A large ulcerated cavity remained, which was gradually growing larger. The bone was thickened and indurated above the ulcer. A fruitless effort was made to clean and heal the
- Amputation. ulcer. Amputation by the modified circular method was performed at the seat of election. The cavity got filled with blood-clots, which had to be removed by finger, after
- Recovery. taking out a few stitches. The wound eventually healed soundly, and the patient was discharged 75 days after the operation, able to walk with the aid of a pin-leg.
- Disorganized knee-joint. **34. Amputation of the Leg for Disorganization and Anchylosis of Knee-joint.**—i. Hindu male, æt. 40. Had suffered for ten or twelve years from articular rheumatism. Three months ago inflammation of right knee-joint occurred, which resulted in abscess. This was opened, but great destruction of tissue took place on the inner aspect of the knee and thigh. On admission his knee-joint was found to be perfectly stiff and acutely flexed; leg wasted and cedematous. A large unhealthy ulcer on the inner aspect of the thigh as far down as the head of the tibia. Hip-joint flexed and stiff. Amputation was performed below the knee-joint, which was anchylosed and obliterated. A circular incision, was made, and the flap dissected up; the tibia was divided quite close to the joint. No stitches were inserted. The operation was performed four days after admission, when the ulcer had taken on a healthy action. The flap was trained to cover the end of the bones and the ulcer. About nine months after the operation was done the ends of the bones had got covered, and the ulcer was nearly
- Amputation below knee.

healed ; the hip-joint had been straightened, and the patient's health greatly improved by tonics and generous diet. The wound remained sweet throughout. Slight oozing took place for a few days. No constitutional disturbance of any consequence occurred. Skin-grafting had been resorted to, to accelerate cicatrization ; the dressings were changed every second, third, or fourth day according to need, and at last removed weekly. He was able to get about with crutches, but eventually the condyles of the femur will afford excellent support for the body on an artificial limb, while the attachments of the extensors and hamstrings remain.

CHAP. VIII.

V. B. 35.

Recovery.

An amputation higher up would have healed faster, but it would have involved greater risk to life and left a less useful stump.

ii. A native Christian girl, æt. 10. Inflammation of the knee-joint occurred owing to a fall in infancy, resulting in permanent flexion of the joint, dislocation backwards of the tibia, and wasting of the leg. Three deep sinuses existed at the lower part of the thigh, reaching the femur. Cavity of the joint filled up. Two oval flaps were taken from the sides of the leg, the tibia divided just below the joint, and the flaps brought together so as to form a longitudinal wound. Some constitutional disturbance followed the operation, and the cavity of the wound underwent suppurative inflammation. Healing finally took place by granulation, leaving a sound longitudinal cicatrix. Her constitutional state greatly improved under treatment, and she was able to walk with ease with the aid of a wooden leg. She remained in hospital for 123 days.

Disorganized
knee-joint.

Amputation
below joint.

Recovery.

In both these cases special measures were used in order to retain the condyles of the femur as a basis of support, and with success.

35. Amputation above the Ankle (Syme's) for Caries of the Tarsus.—i. Hindu male, æt. 30. Sustained a sprain of left ankle six months before admission. Inflammation of the joint followed. Two incisions had been made by a medical man. He was kept under treatment for three months, during which rest, counter-irritation, and constitutional treatment were thoroughly tried. Abscesses formed around

Disorganized
ankle-joint.

CHAP. VIII. the joint, resulting in sinuses, and the joint became thoroughly disorganized, and the bones entering into its formation carious. Amputation was performed at the ankle according to Syme's plan. The amputation wound became the seat of unhealthy inflammation; burrowing took place up the leg. Sinuses, filled with gelatinous granulation material, formed. The skin melted away, and the bones of the leg became bare and eroded. The patient had several attacks of diarrhoea and dysentery. After seven months' patient efforts to induce repair, an amputation higher up was considered necessary. The wound was kept aseptic throughout. The patient was found to be labouring under phthisis pulmonalis.

Failure.

Re-amputation. ii. **Re-amputation of the Leg for Caries.**—The same subject. Amputation was performed at the middle of the leg by modified circular method under strict antiseptic precautions. The wound healed by first intention in twelve days. A fortnight later, after a smart attack of fever, a small abscess formed in the stump cavity, which discharged and healed. Patient subsequently, after the wound had completely and finally healed, had a violent attack of dysentery, succeeded by phagædenic ulceration of the mouth. He eventually died of phthisis.

Death from phthisis.

This case is an admirable example of the difficulties with which surgery has to contend in a tuberculous subject.

Syme's amputation for caries of tarsus.

36. i. **For Caries of the Tarsus.**—Hindu male, æt. 40. Two years' duration: health bad. Extensive caries of tarsus and lower end of tibia and fibula. Syme's amputation; died of pleurisy in six days.

ii. Hindu male, æt. 38. Resection of the tarsus had been performed (*vide* IV. i. xii.); the amputation was done on 20th May. Suppuration took place in the stump cavity, leading to sinuses, which required repeated incision, and healed very slowly. Left hospital with a moveable and very callous stump.

Syme's amputation for cancer of foot.

37. **Amputation above the Ankle (Syme's) for Cancer.**—Hindu male, æt. 40. Admitted with epithelioma of right foot developed on the cicatrix of a burn sustained in childhood. Health bad; history of syphilis. Amputation at the ankle performed by Syme's method. The cavity

of the wound inflamed and suppurated, and some sloughing took place. Repair set in in course of a week, and the case promised well until symptoms of tetanus set in on the fifteenth day. These symptoms gradually became more severe, and death took place from exhaustion 24 days after operation and nine after appearance of tetanus.

CHAP. VIII.

Tetanus.

Death.

Comment.—Amputations, as distinguished from dis-articulations, have come to be considered the best test of the salubrity of hospitals and of the success of cutting operations; and if due allowance is made for the various circumstances affecting surgical statistics which have been sketched in Chapter II., there is no doubt that a better criterion cannot be found. Mere figures without data on which an explanation and analysis of them can be founded are, however, utterly valueless for the purpose of comparing one institution, period, or system with another. Similar terms and quantities may cover and conceal such serious and fundamental diversities in the cases themselves, that the former are not capable of true comparison, and that any conclusions drawn from such comparison are unreal. It is fortunate that, through the industry of Sir Joseph Fayrer, a comparison can be instituted on the basis of the mortality following amputations, between two periods in the history of the Medical College Hospital, separated by nearly ten years. In his "Clinical and Pathological Observations in India" (p. 488), Fayrer has recorded statistics of all the amputations performed by him in the hospital during the years 1859-70 inclusive, and has also illustrated these statistics by analyses and details of cases and comments upon the causes of mortality.

Amputations as a test for the salubrity of hospitals.

Fayrer's observations.

The class of patients admitted, the rules of admission, and the character of cases operated on, have remained much the same, and no principle of selection has been pursued in either period. The sites and modes of operating have been very similar. On the other hand, the sanitary state of the town and hospital have

CHAP. VIII.

Comparison of
statistics of
1850-70 and
1879-83.

undergone some changes for the better, and the introduction of Esmarch's bandages and cords for the prevention of loss of blood, and of Lister's antiseptics for the prevention of septic changes in wounds, have constituted material changes in practice. A comparison of Fayrer's figures and those included in this record is therefore as fair as possible, and offers a very interesting and instructive contrast. I have included disarticulations in these tables, as they are too few in number to affect the result of comparison, and their proportion to other operations is very similar in both cases. I have, however, omitted amputations of the hand and foot:—

Fayrer's Amputations—1850 to 1870 inclusive.

	Hip-joint and Thigh.			Knee-joint and Leg.			Shoulder-joint and Arm.			Elbow-joint and Forearm.			Total.		
	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.
For { Primary	2	2	100	35	22	62.8	7	4	57.1	8	4	50	52	32	61.5
Injury { Secondary	16	14	87.5	7	6	85.7	9	6	66.6	3	2	66.6	35	28	80.0
For disease ...	19	17	89.5	19	9	47.4	9	4	44.4	4	2	50	51	32	62.7
Total ...	37*	33	89.2	61	37	60.6	25†	14	56	15	8	53.3	138	92	66.6

Amputations detailed in this work—1879 to 1883 inclusive.

	Hip-joint and Thigh.			Knee-joint and Leg.			Shoulder-joint and Arm.			Elbow-joint and Forearm.			Total.		
	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.	No.	D.	Per cent.
For { Primary	1	1	100	3	1	33.3	4	1	25	3	0	...	11	3	27.2
Injury { Secondary	5	3	60	3	0	...	5	1	20	1	1	100	14	5	35.7
For disease ...	8	4	50	9	2	22.2	4	1	25	1	0	...	23	7	31.8
Total ...	14	8	57.1	15	3	20	13‡	3	23.0	5	1	20	47	15	31.9

* Includes six hip-joints (five fatal).

† Includes eleven shoulder-joints (seven fatal).

‡ Includes five shoulder-joints (three fatal).

It will be observed that the proportion of the sites and classes of operations do not materially differ. Thus :—

CHAP. VIII.
Analysis of
tables.

Percentage of Operations.

	Thigh.	Leg.	Arm.	Forearm.
First Table	27	44	18	11
Second Table	29	32	28	11

Percentages of Classes.

	For Injury.		For Disease.
	Primary.	Secondary.	
First Table	38	25	37
Second Table	23	29	48

It will also be noticed that the rhythm of mortalities of different classes agrees fairly well in the two series. Thus the death-rates after amputation for injury (69 and 32), exceed those for pathological amputations (63 and 32), and the rates for secondary amputations (80 and 36) exceed those for primary (61 and 27). The mortality of the later series of amputations on the whole is somewhat less than one-half that of the earlier, and this proportion is approximately maintained in all sites and classes.

The causes of mortality in both series are contrasted in the following statement :—

Causes of
mortality com-
pared.

Causes.	First Series.		Second Series.	
	Numbers.	Percentage.	Numbers.	Percentage.
Gangrene	12	13	2	13.3
Pyæmia and Septicæmia	24	26	...	...
Osteomyelitis	19	20.7	...	...
Pulmonary Embolism ...	5	5.6	...	...
Exhaustion	19	20.6	3	20
Shock ... ..	...	...	5	33.3
Tetanus	7	7.5	3	20
Other causes	6	6.5	2	13.3
Total ...	92	100	15	100

CHAP. VIII.

Absence of
septic disease
in late series.

The remarkable feature in this contrast is the absence of septic disease as a direct or principal cause of death, and this may fairly be attributed to the improvements which have taken place in hospital and wound hygiene.

In commenting on the high death-rate of thigh amputation, Sir Joseph Fayrer wrote in the work from which these figures have been taken the following remarkable passage :—

Fayrer on the
excessive mor-
tality following
amputation of
the thigh.

"It is well known that in Calcutta amputation of the thigh is an operation hitherto seldom successful. The statistics, as far as I know, have been unfavourable in all the hospitals. This is due no doubt to a combination of causes—such as a cachetic state of the patient; late treatment of the disease; an exhausting malarious and depressing state of climate acting most prejudicially on the blood-elaborating organs and diminishing the powers of resistance to shock, and then of carrying on repair; a great tendency to suppuration, and with it to septic conditions of various forms; and added to these, I fear, must be defective hospital construction and hygiene, and (certainly during the period included in this return) an endemic tendency to osteomyelitis—a most prolific originator and concomitant of pyæmia, and one of the most fatal of all surgical complications.

"It is satisfactory to know that this particular evidence of septicaemia (osteomyelitis) has greatly diminished during the past two or three years, owing probably to improved drainage, clearing out of space surrounding the hospital, better ventilation, reduction of number of beds, to the free use of carbolic acid, and perhaps also to one of those mysterious changes of endemic constitution which doubtless exist, though not understood. Bad as, at the best, are the statistics of thigh amputations, I believe they have never represented a higher death-rate than those I now record, and which I think it is well should be noted, suggest-

ing, as they do, interesting matter for profitable reflection on the effects of climate, the nature of hospital construction and hygiene, and the existence of endemic tendencies to pyæmia in reference to the subject of surgical operations, and treatment generally in damp and hot climates like that of Bengal, where all the natural evils are intensified by the adventitious ones of a great city."

CHAP. VIII.

The climatic and personal causes enumerated in this extract remain much the same as they were, and will probably always maintain a comparatively high death-rate in the hospitals of Calcutta; but the hygienic conditions have undergone amelioration, and there is every reason to hope that closer attention to general and wound hygiene will still further reduce the mortality after amputations in these hospitals, which has already fallen to a near approach to European standards. Some improvement had taken place, more particularly in the prevalence of osteomyelitis, before Fayrer had left Calcutta. This improvement has been progressive ever since. This is evidenced by the statistics collected by the Committee appointed in 1878 by the Government of Bengal to investigate and consider certain matters connected with the administration and mortality of the Calcutta hospitals. The following table, extracted from the Report of this Committee, indicates a mortality intermediate between that shown by the foregoing tables.

Probable
causes of
diminished
mortality.

Mortality of
amputations
in 1870-1877.

Statement showing the Mortality following certain Amputations performed in the Calcutta Medical College during the years 1870-1877 inclusive.

Year 1875-1877 inclusive.																
Class.		Thigh.			Leg.			Arm.			Forearm.			Total.		
		No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.
For Injury	Primary	16	11	68.7	20	6	30	10	4	40	17	0	...	63	21	33.3
	Secondary	10	7	70	14	10	71.4	7	3	42.8	11	7	63.6	42	27	64.2
For Disease ...		10	6	60	11	5	45.4	5	1	20	10	1	10	36	13	36.1
Total ...		36	24	66.6	45	21	46.6	22	8	36.3	38	8	21.0	141	61	43.2

G

CHAP. VIII.

Modified
antiseptics.Hospitalism
in 1874-75.Statistics of
thigh amputa-
tions.Schede's
statistics.

This may be called the period of modified antiseptics, in which carbolic irrigation or spray was employed during the performance of operations, and dressings of carbolic or boracic acid were employed in the after-treatment. I officiated as second surgeon in the Hospital within this time—from April 1874 to May 1875 inclusive—and performed 11 amputations, of which 6 died, or 54·5 per cent. Erysipelas and diffuse cellulitis were exceedingly common, and union without suppuration very rare. Having had no practical experience of the Listerian system, I endeavoured to imitate the descriptions of it which at that time existed in the medical periodicals, and I afterwards found, on closely following Lister's lectures and practice in the Edinburgh Infirmary in 1876-77, that I had fallen short of the minute care necessary for fully realizing his method and achieving his success. In further illustration of the improvement which has taken place in respect of the mortality following amputations, the figures on page 83, relating to thigh amputations, which I collected from all parts of the Bengal Presidency, and which were carefully tabulated by Surgeon K. M. Downie, M.B., of the Indian Medical Service, tell the same tale as those included in the tables already printed.

The inference from this table is, that through the influences above mentioned the mortality of thigh amputation in the Calcutta Medical College has approached the level of the small provincial hospitals, and bears a much more favourable comparison with European standards.

The statistics of amputation have been presented by certain writers in another form. An effort has been made, for the purposes of more exact and fair comparison, to separate "uncomplicated" cases from those complicated by coincident amputations elsewhere, by other injury than that for which amputation has been performed, by septicaemia or tetanus, and by constitutional disease. The statistics collected by Max Schede, in order to compare the results of non-antiseptic and antiseptic practice, have been compiled on this prin-

Statistics of Thigh Amputations.

Source of Statistics.	Amputations for Injury.						For Disease.			Total.		
	Primary.			Secondary.			No.	D.	P.C.	No.	D.	P.C.
	No.	D.	P.C.	No.	D.	P.C.						
	No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.
Small Hospitals throughout Bengal	46	24	52.1	59	27	45.7	68	22	32.3	173	73	42.1
Calcutta Hospitals	26	21	80.7	25	21	84.0	34	26	76.4	85	68	80.0
Payor's figures	1	1	100	14	13	9	16	14	87.5	31	28	90.3
Author's figures	1	1	100	5	3	60	8	4	50	14	8	57.1
Hospital Committee's figures	16	11	68.7	10	7	70	10	6	60	36	24	66.6
Table, Appendix A.	...	...	...	...	...	...	...	...	...	210	93	44.3
Erichsen, University College Hospital	...	...	...	...	...	...	...	...	...	125	41	32.8
Lane, various sources	...	...	...	...	...	...	...	...	...	2429	1033	43.3
Maigne, Parisian Hospitals	...	...	...	...	...	...	...	...	...	199	129	64.8

ciple. It is not easy fairly and equally to tabulate results on this principle, but in the following table I have made the attempt.

Classes.	Schede's Statistics.						Author's Figures.		
	Pre-antiseptic.			Antiseptic.					
	No.	D.	P.C.	No.	D.	P.C.	No.	D.	P.C.
1. Uncomplicated	377	110	29.18	321	14	4.4	18	2	11.1
2. Double Amputations ...	10	3	30	13	3	23.8	...	...	...
3. Complicated by other Injuries	5	4	80	11	8	72.7	4	2	50
4. Complicated by Septicæmia, Tetanus, &c....	48	40	83.33	45	30	66.6	17	6	35.3
5. Complicated by Constitutional Disease... ..	21	21	100	27	16	59.26	8	5	62.5
Total ...	461	178	38.83	417	71	17	47	15	31.9

Figures arranged on Schede's plan.

- CHAP. VIII. It would be possible, by eliminating cases of such gravity as to offer little hope of success, but in which some chance of relief impelled operation, and cases in which, though uncomplicated, previous shock or hæmorrhage had seriously impaired the patient's tolerance of operation, to reduce the mortality to very small dimensions; but manipulations of this kind are of very questionable propriety or use, and it seems better to leave the figures and cases to speak for themselves than make any effort to cook them.
- Propriety of manipulating figures doubted.
- Method of operating.
- The method of operating employed in these cases was, except in special operations such as Carden's and Syme's, what is called the modified circular. Oval flaps were cut by dissection, and reflected up to the level of their base; the muscles were divided obliquely from that level, the periosteum carefully cut, and the bone sawn at the apex of the cone. Esmarch's cord was always used after the limb had been raised, according to Esmarch's cord.
- Esmarch's cord.
- Listerism.
- Lister's directions. Antiseptic precautions (including the spray) were invariably employed to prevent putrefaction and extirpate it when present. In the great majority of cases these measures proved successful.
- Drainage.
- Drainage was carefully attended to, the means employed being caoutchouc tubes and leashes of catgut. Light pillows and splints were bandaged to the limb to support and maintain it at rest. This practice was found to add greatly to the comfort of the patient and to promote repair of the wound.
- Splints.

CHAPTER IX.

REMOVAL OF TUMOURS (BY EXCISION).

Cases, 253 ; Deaths, 48.

A. MALIGNANT TUMOURS.

Cases, 48 ; Deaths, 13.

VI. 1. i. **Scirrhus of Mamma and Axillary Glands.** Cancer of breast.
—Hindu female, æt. 40. One year's duration ; left axillary glands extensively diseased. Breast removed and glands extirpated. Died of pleurisy in five days. Antiseptically performed, but became putrid. Removal. Death by pleurisy.

ii. East Indian female, æt. 40. Fifteen months' duration. Left mamma excised antiseptically ; lymphatic glands thoroughly removed from axilla. Part of lower flap sloughed. Portion of wound healed by first intention, remainder by granulation. Discharged with sound cicatrix in 76 days. Cancer of breast. Removal. Recovery.

iii. Hindu female, æt. 45. Two and a half years' duration. Last child sixteen years old. Right mamma, with skin covering it, thoroughly extirpated. Axilla cleared of glands and an enlarged and indurated gland above clavicle also removed through axilla. Operation performed antiseptically, followed by severe shock, succeeded by reaction. No absorptive fever. Discharged with sound cicatrix in 50 days. Cancer of breast. Removal. Recovery.

The axillary vein was temporarily ligatured in this case, to prevent venous bleeding. The ligature was subsequently removed ; no harm followed. Temporary ligature of axillary vein.

iv. Hindu female, æt. 45. Right breast ; eleven months' duration. Skin sparingly involved ; tumour moveable over pectoral muscle ; hard cord running towards right axilla, glands of which were involved. General health poor. Had Cancer of breast.

CHAP. IX.	borne no children. Gland removed antiseptically; oval
VI. A. 1.	piece of skin covering gland taken away; axillary glands
Removal.	dissected out. Lower flap sloughed and suppurative cellulitis of chest wall took place, ending in abscess which required opening. Putrefaction was averted throughout by careful use of antiseptics. Constitutional disturbance moderate; had an attack of dysentery for fifteen days during second month. Wound finally healed by granulation, and patient was discharged well, after a stay in hospital of 145 days.
Recovery.	
Cancer of breast.	v. Hindu female, æt. 50. Tumour of right breast of two years' duration; inflamed and ulcerated ten months ago; moveable over pectoralis major; axillary glands enlarged and indurated; general health good. Tumour and axillary glands extirpated along with the skin covering the mamma. Portions of pectoralis major and serratus magnus subsequently dissected away because of infiltration; edges of wound brought together by button stitches and wire sutures. Operation performed under strict antiseptic precautions. Fell into a state of collapse immediately after, and remained low for two days (temp. 96°). Wound remained aseptic for six days, and then became putrid. Diarrhœa set in, and sloughing invaded flaps and wound. Symptoms of septic poisoning occurred; purging and vomiting continued; the wound gaped and became gangrenous, and death ensued from exhaustion and septicæmia nineteen days after operation.
Removal.	
Septicæmia.	
Death.	

This was a very severe operation, involving great shock and considerable loss of blood. The case promised to do well until, through some accident, putrefaction gained access to the wound. The fatal sequence—diarrhœa, vomiting, septicæmia, gangrene—rapidly followed.

Cancer of breast.	vi. European female, æt. 25. Scirrhus of left breast of one year's duration; ulcerated above nipple; moveable over pectoral muscle; enlarged indurated glands in axilla; mamma with skin covering it removed by two semi-lunar incisions. A suspicious piece of pectoralis major dissected off; axillary glands extirpated; catgut drain used. Operation performed under strict antiseptic precautions. Suffered from shock, with vomiting and restlessness during the day,
Removal.	

followed by smart reaction ; went on well for five days, when she had a rigor, succeeded by high fever which ranged from 99° to 104°, and lasted to the end. The wound remained aseptic, and repair was in active and satisfactory progress. Diarrhœa, vomiting, and smoky urine were observed, and the dressings at once changed from carbolic to boracic acid, thymol lotion being used as spray and for irrigation. The left arm and left side of the face became tensely œdematous ; patient became comatose, with low muttering delirium. Hypostatic congestion of the lungs set in, and death ensued nineteen days after operation. On examination of the tumour after death its structure was found to be inflammatory rather than cancerous. Clinically it presented all the features of malignancy—pain, cachexy, infiltration, rapid but gradual growth, and breaking down into a sloughy cavern with indurated base and edges and irregular mammillated surface.

I am inclined to attribute the unfortunate issue in this case to carbolic acid poisoning. The wound pursued an aseptic course, and repair was proceeding actively. The only trace of suppuration which was observed was a little pus which formed at the outer angle. The gastro-enteric irritation, smoky urine, pyrexia, and head symptoms point to carbolic absorption. The change of dressings produced no improvement. Thrombosis had apparently taken place in the left axillary and innominate veins. A post-mortem examination could not be obtained.

vii. East Indian female, æt. 52. Four months' duration ; nipple retracted. Patient anæmic and very fat. Gland thoroughly removed by an elliptical incision including all suspicious skin ; a mass of suspicious glands taken out of the axilla ; skin edges brought into contact. Operation performed under strict antiseptic precautions. Discharge became grumous and gangrenous about a week after operation, and remained so for six days ; constitutional disturbance slight. The wound united by first intention, and discharge gradually became scanty and lymphic. Left hospital in 45 days with a sound linear cicatrix.

Cancer of breast.

Removal.

Recovery.

CHAP. IX.	viii. Hindu female, æt. 40. Scirrhus of right breast;
VI. A. 2. a. b. c.	commenced a year ago; became open a fortnight ago. Several
Cancer of breast.	hard enlarged glands in axilla. Breast extirpated, and
Removal.	axilla thoroughly cleared out. Wound not stitched; dressed
Recovery.	with boracic lint and carbolic gauze. Wound remained
	aseptic, and filled up rapidly with granulation matter. No
	constitutional disturbance. Left hospital in 76 days with a
	linear cicatrix. No sign of recurrence.
Cancer of scalp.	2. a. Epithelioma of Scalp.—Mahomedan male, æt. 40.
Removal.	Eight years' growth. Tumour had been excised two years
Recovery.	previously in the Mitford Hospital. Situated on vertex,
	three inches diameter. Removed antiseptically with a
	ring of healthy skin; skull stripped of periosteum to the
	extent of a rupee. Remained sweet. Healed by granula-
	tion; no constitutional disturbance. Soundly cicatrised in
	72 days.
Cancer of cheek.	b. Epithelioma of Cheek.—i. Hindu male, æt. 39.
Severe operation.	Disease of four months' duration. Extensive infiltration
Death.	and perforation of the cheek. It became necessary to
	remove the left half of the lower jaw, part of the upper,
	the sub-maxillary gland, and three cancerous cervical glands.
	Patient never rallied from the shock of the operation, and
	died next day.
Cancer of cheek.	ii. Hindu female, æt. 40. Disease of two months' dura-
Severe operation.	tion. Villous growth on inside of the right cheek; skin
Recovery.	covering it infiltrated. Parotid gland indurated and en-
	larged; tumour excised. Hæmorrhage controlled by round
	œsophagus forceps closed above and below the growth.
	Parotid entirely extirpated, its deep connections having
	been previously tied by strong catgut threads; wound of
	cheek healed by first intention and remainder by granulation.
	Atresia prevented by use of Smith's gag. Left hospital in
	60 days with sound cicatrix; very little facial paralysis, and
	no sign of return of disease.
Cancer of cheek.	c. Epithelioma of Right Cheek and Jaws.—Hindu
Formidable operation.	male, æt. 35. Admitted with a cancerous tumour of three
	months' duration, involving the right cheek and both upper
	and lower jaws. Appears to have commenced on the inside of
	the cheek. The whole cheek was removed, with upper and
	right half of lower jaw and the right parotid and sub-
	maxillary glands. Flaps brought from the neck and

opposite side of the face. Suffered from shock succeeded by reaction of an unsatisfactory kind (prostration with excitement). Died of exhaustion six days after the operation. The flaps retained their vitality, and there was no bleeding.

CHAP. IX.

VI. A. 2. d.

Death.

d. **Epithelioma of Lip.**—i. Mahomedan male, æt. 40. Cancer of lip. Two months' duration; involved whole of lower lip, which was thickened, indurated, everted, and ulcerated; lymphatic glands below chin enlarged, and a solitary gland on right side of middle line lower down. General health indifferent. Lower lip entirely removed. Vertical incision $1\frac{1}{2}$ inch long, carried down to chin, and lateral curved incisions from the end of it downwards and outwards; flaps dissected off. A few labial glands removed, and the whole of the enlarged lymphatic glands. Flaps united in middle line and raised so as to form a new lower lip, which was first held up by wire loops secured to a bandage fastened round the head, and then by buttons, the wires attached to which were fastened to the teeth. Wound healed mostly by first intention, the triangular wound below the chin by granulation; suffered from pneumonia and parotitis; made a satisfactory recovery. Lower lip half covered the teeth, and mouth could be closed almost completely. No reappearance of the disease during the 72 days he spent in hospital after the operation.

Plastic operation.

Recovery.

ii. Mahomedan male, æt. 55. Said to be of twenty days' duration. Involved the whole of the lower lip, which was removed by a V-shaped incision; flaps were taken from beneath the chin and raised to the level of the teeth. Union took place, and patient left hospital in 21 days with a good substitute for the lost lip.

Cancer of lip.

Recovery.

iii. Eurasian male, æt. 55; $1\frac{1}{2}$ month's duration. Cancerous ulcer of left side of lower lip near angle; submaxillary gland also enlarged and indurated. removed by V-shaped incision. Gland dissected out. There was very free bleeding, and the facial artery required double ligation. Lip wound healed by first intention, the inflamed, suppurated, and healed by granulation. Discharged in 29 days.

Cancer of lip.

Growth Removal.

Recovery.

Returned in four months with recurrence under the jaw; lip sound. Left half of body of lower jaw removed, all the soft tissue covering it; also sublingual gland removed.

Recurrence.

Second operation.

CHAP. IX.	Plastic operation afterwards required to fill up the aperture.
VI. A. 2. c.	Made a good recovery. Disease returned subsequently in a
Recurrence.	lymphatic gland at the root of the neck.
Cancer of tongue.	e. Epithelioma of the Tongue.—i. Hindu male, æt. 40.
Preliminary tracheotomy.	Five months' duration; ragged ulcer on dorsum of tongue near root; base indurated, and posterior third of organ generally infiltrated; floor of mouth and gums healthy. Enlarged and indurated glands below inferior border of lower jaw; general health good. Tracheotomy performed, and chloroform administered through tube; pharynx stuffed with sponges. Incision made in middle line above hyoid bone
Barwell's operation.	and mesial aponeurosis of mylohyoid divided; tongue separated from floor of mouth by scissors; aneurism needle passed through base, and chain ecraseur brought through mental wound; tongue pulled forward and three-fourths of organ extirpated, remainder removed by ecraseur in two sections. Tracheotomy tube removed next day. Fed with a
Recovery.	soft catheter for a few days. Began to sit up and walk about after three days; wound of floor of mouth healed kindly by granulation, and submental and tracheotomy wounds united
Result.	rapidly, leaving linear cicatrices. Left hospital 53 days after operation with wounds soundly healed; could swallow well, and distinguish salt from sugar by taste. Able to
Recurrence.	articulate intelligibly. Returned in three months with recurrence of disease in the floor of the mouth; faucial aperture much contracted: no further operation resorted to. (See <i>Indian Medical Gazette</i> , vol. xvi., 1881, p. 285.)
Cancer of tongue.	ii. Hindu male, æt. 40. Disease of 1½ year's standing. Implicated the dorsum and right side of the tongue; the right submaxillary gland enlarged and indurated, also some lymphatic glands under the sterno-mastoid. Tongue secured by a stout ligature passed through its apex. Incision made in the middle line from the symphysis to the hyoid bone. This was deepened, and the mylohyoid aponeurosis divided. The genio-hyo-glossi were detached from their tubercles, the mucous membrane and palato- and stylo-glossi divided by scissors. The base of the tongue was transfixed by an aneurism needle introduced through the wound, through which also the chain of an ecraseur was passed and carried behind the needle. The organ was thus severed and removed through the mouth: no bleeding of consequence.
Barwell's operation.	

The diseased submaxillary and lymphatic glands were subsequently removed by dissection. The facial artery had to be tied. Suffered from shock succeeded by reaction. The wound became sloughy, and free secondary hæmorrhage occurred on the sixth day. The clots were removed, and the bleeding point secured, but he died of exhaustion on the morning of the seventh day. CHAP. IX.
VI. A. 2. f.
Secondary hæmorrhage.
Death.

f. **Epithelioma of Larynx.**—i. Hindu male, æt. 35. Cancer of larynx.
Disease of seven months' duration. Lost his voice about a year ago; a weakly man subject to chronic diarrhoea. A cauliflower-like growth, about the size of a child's fist, existed over the larynx, rather on the right side of it. The surrounding skin was somewhat infiltrated, and the body of the larynx and right lobe of the thyroid body were evidently implicated. The disease could be felt with the finger through the rima glottidis; the epiglottis seemed to be sound. Extirpation of the larynx and thyroid body was performed on the 15th November. An elliptical incision was made around the growth, including it and a liberal margin of skin. The larynx was isolated by dissection; the thyroid arteries tied with catgut and then divided. The trachea was divided at the second ring, and the larynx removed by scissors. Epiglottis left behind. He was fed by nutrient enemata for a few days, then by means of an elastic catheter passed into the œsophagus through the wound. Healing took place slowly, but without serious hinderance. The anterior wall of the pharynx was deficient to the extent of about 2 inches; the tracheal opening situated below it. He could swallow with the aid of an india-rubber bandage wound round the neck, was able to whisper when he placed the palm of the hand over the opening, and an artificial larynx was constructed for him. His health was fairly good until about four months after the operation, when signs of pulmonary phthisis became evident. These increased rapidly, and he died 5½ months after the operation. (Vide *Indian Medical Gazette*, vol. xviii., pp. 24, 51, 139; also *Lancet*, Sept. 15, 1883.) Operation.
Recovery.
Result.
Death in 5½ months, from phthisis.

ii. Hindu male, æt. 40. Disease of one year's duration; hard vascular mammillated growth visible below right tonsil; folds of glottis felt thick, hard, irregular, and indurated. Indurated swelling perceptible around and Cancer of larynx.

CHAP. IX.

VI. A. 2. g. h.
Operation.Secondary
hæmorrhage.

Death.

behind larynx on palpation. An enlarged hard lymphatic gland behind right sterno-mastoid. Loss of voice and considerable dyspnœa. Anæmic and wasted. Operation of extirpation of larynx performed; thyroid body found healthy and not removed. Pharynx extensively diseased; isolated by dissection and removed by ecraseur. Diseased gland dissected out; wound left open. Suffered from shock, succeeded by smart reaction. Condition was improving and wound doing well, when on the morning of the fifth day secondary hæmorrhage occurred. It was stopped by pressure, but recurred violently in the afternoon and caused death. The bleeding was venous. No *post mortem* was allowed. Had been nourished by enemata and liquids introduced into the œsophagus by means of a soft catheter. (For full details of the case, vide *Indian Medical Gazette* for December 1883, p. 348; and *Lancet*, No. xvii. of vol. i. of 1884, p. 750.)

Cancer of
shoulder fol-
lowing burn.

Operation.

Recovery.

Cancer of
abdominal
wall.

g. Epithelioma of Shoulder.—Hindu female, æt. 45. Sustained a severe burn at sixteen years of age, which caused loss of right pinna, and resulted in cicatricial bands pulling head and face towards right shoulder, and established the condition of torticollis. A hard swelling appeared a year ago over spine of scapula, resulting in an ulcer with a hard base attached firmly to the bone; neighbouring tissue much infiltrated and indurated. Ulcerated tumour dissected off, and subjacent bone freely removed by gouge and osteotrite; enlarged lymphatic glands in posterior triangle removed; cicatricial bands divided transversely and stitched longitudinally; flaps taken from the nape of the neck and transplanted on to the side of the neck. A very large wound remained. Operation performed antiseptically; wound remained sweet, and healed very slowly by granulation. Skin-grafting attempted twice unsuccessfully. Made a good recovery in 230 days. Wry neck much improved; no reappearance of disease.

h. Epithelioma of the Abdominal Wall.—Hindu male, æt. 50. The actual cautery had been applied in several places over the spleen in his youth for enlargement of that organ. The cancer commenced two years ago in the site of one of the cicatrices of these burns. It had attained the size of a full-blown rose, diameter $3\frac{1}{2}$ inches. Deeply

movable. Enlarged veins in the neighbourhood; general health fair. Dissected out. Abdominal muscles removed layer by layer till the transversalis fascia was reached. A bit of the rectus and its sheath had also to be cut away. Healed by granulation in 99 days. Suffered from bronchitis and diarrhoea during convalescence. Skin-grafting, both primary and secondary, failed owing to profuse discharge and the restlessness of the patient. No sign of recurrence.

i. **Epithelioma of the Penis.**—i. Chinaman, æt. 60; twelve or thirteen years' duration. Penis amputated near pubis; urethra stitched to skin. Recovered. Discharged in 30 days. (Dr. Palmer.)

ii. Hindu, æt. 25. One year's duration; lateral skin flaps and corpus spongiosum divided three-quarters of an inch longer than corpora cavernosa. Good result. Discharged in 37 days.

iii. Hindu, æt. 45. Eight months' duration. Corpora cavernosa removed at root. Corpus spongiosum healthy, separated from corpora cavernosa; brought out below testes about 2 inches in front of anus; testes covered in by scrotum, which healed rapidly; troublesome sinus behind them, which continued to discharge an abundance of fetid pus until patient left hospital. This sinus burrowed beneath the skin of the pubis, laying bare the bone; the man got a severe attack of pneumonia, and was removed, against advice, by his friends in a weak and critical condition.

iv. Hindu male, æt. 29. Disease of one and a half year's duration, consequent on phimosis; skin divided circularly; corpus spongiosum left longer than corpora cavernosa, and stitched at lower angle of wound. Bleeding stopped by stitching corpora cavernosa with catgut. Result satisfactory. Left hospital in 32 days.

v. Hindu male, æt. 25. Had soft chancre and phimosis eight years ago; latter treated by circumcision, which left an induration, which has gradually extended and ulcerated, invading the glans and body of the penis; growth warty, tubercular, or mammillated. removed about an inch from the root; corpora cavernosa divided higher than corpus spongiosum, which was stitched to the edges of a slit in a ventral flap. Bleeding stopped by catgut ligatures. Mass of cancerous lymphatic glands re-

CHAP. IX.

VI. A. 2. f.

Removal.

Recovery.

Amputation of
penis for
cancer.

Ditto.

Severe
operation.Death by
pneumonia.Amputation of
penis for
cancer.Method of
operating.

CHAP. IX.

VI. A. 2. i.

Sulphate of iron as an antiseptic.

moved from left groin. Dressed with sulphate of iron lotion (gr. x. to \bar{z} i.). This did not keep the wounds aseptic. Both suppurated and healed by granulation. The final result was satisfactory. Left hospital 37 days after operation, with wounds soundly healed, patent urethra, and no sign of recurrence.

Amputation of penis for cancer.

vi. Hindu male, æt. 40 . Operation of circumcision performed for phimosis three years ago. An indurated sore appeared in the cicatrix six months after, which invaded the penis, amputation of which was performed eight months ago. The disease recurred in the stump, and the right inguinal glands became enlarged, indurated, and then broke down and fungated; tumour and glands thoroughly extirpated with the skin covering them, and the aponeurosis of the external oblique—both pillars and part of Poupart's and Gimbernat's ligament—to which the diseased glands were intimately glued. A very large wound resulted, the edges of which were approximated by button stitches. It was dressed antiseptically and remained sweet. It healed by granulation. Patient left hospital 85 days after the operation with a sound cicatrix, a patent urethra, and no sign of recurrence of the cancer. No tendency to hernia was observed, although the pillars of the outer ring had been removed along with a large piece of the aponeurosis of the external oblique.

Inguinal glands removed.

Recovery.

Function of the conjoined tendon in preventing hernia.

The principal interest of this case, apart from the necessary severity of the operation, consists in the demonstration which it affords that it is the conjoined tendon that constitutes the principal agent in preventing formation of hernia; the external ring forming a very secondary and feeble adjuvant.

Amputation of the penis for cancer.

vii. Hindu male, æt. 50 . Disease of four months' growth; had gonorrhœa and bubo three years ago. Originated in the prepuce, and involved only the skin, which, together with a portion of the glans, was removed by knife. The wound healed in 23 days, and there was no appearance of recurrence when he left hospital.

viii. Hindu male, æt. 40 . History of syphilis fifteen years ago. Had undergone circumcision three years before admission.

and suffered from suppurating bubo on the right groin and a large abscess of left thigh. Present disease commenced one year ago at the glans, and anterior half of the body of the penis affected; enlarged and indurated glands in left groin. An oval skin incision was made well beyond the limit of disease, the corpus spongiosum separated from the corpora cavernosa, and divided at a lower level. The edges of the fibrous cylinder of the latter were brought together by catgut stitches to stop bleeding. The wound was finally stitched, and the extremity of the corpus spongiosum brought out at its lower angle. The diseased inguinal glands were removed by dissection; one of them extended into the saphenous opening. The wounds healed by granulation. He left hospital in 38 days with a patent urethra, and no symptom of return of the disease.

CHAP. IX.

VI. A. 2. j.

Amputation of
penis for
cancer.Inguinal
glands
removed.
Recovery.

This patient presented himself about seven months after the operation with recurrence in both the penis and groin. Nothing further could be done for him.

ix. Hindu male, æt. 50. History of syphilis and salivati-
on 30 years ago. Present disease of four months' duration;
glans and anterior third of penis implicated. Disease
removed by transverse incision beyond its limit; urethra
slit on under surface and stitched to skin; wound left to
granulate. It healed in 21 days, and there was no sign
of recurrence at the time of patient's discharge from
hospital.

Amputation of
penis for
cancer.

x. Hindu male, æt. 40. History of gonorrhœa eighteen
months ago. Present disease of six months' duration;
involved the glands, and a small part of the adjacent body of
the organ. Operation as in case ii. Wound healed in
27 days—result satisfactory. No signs of recurrence.

Ditto.

j. Epithelioma of the Buttock.—Hindu male, æt. 21. Large cancer
Commenced to grow from a wart two years ago; spread
over the greater part of the right buttock—diameter 6½
inches. The mass was dissected off as in case k. A
circular incision was made through the skin well beyond
the margin of the growth, which was undermined from all
sides, the incision being deepened according to the depth of
the infiltration. Three indurated inguinal glands were also
removed. The wound healed by granulation in 118 days.

Large cancer
of buttock.

Removal.

Recovery.

- CHAP. IX. Grafting was twice tried without success. There was no sign of recurrence when the man left hospital.
- VI. A. 2. k. l. **Extensive cancer of the thigh.** *k. Epithelioma of Thigh.*—i. Hindu male, æt. 60. Right thigh; burn 46 years ago. Ulcerated 30 years ago, and has been growing rapidly of late; fascia lata slightly involved but not muscles; removed with subjacent fascia; wound 8 in. by 4. Cicatrised soundly. Discharged in 93 days.
- Ditto. ii. Mahomedan male, æt. 40. Four years' duration; situated on inner side of right buttock; foul ulcer about 1 inch in diameter set on a raised hard base and surrounded by thickened, indurated, and infiltrated skin not moveable over subjacent fascia. Mass removed along with fascia, leaving a large open wound about 5 inches long which was left to heal by granulation. This process occupied 76 days. Left hospital with a sound cicatrix and no reappearance of disease.
- Warty tumour of leg. *l. Epithelioma (?) of Leg.*—Hindu female, æt. 48. Warty-looking growth on outside of right leg below knee, of 34 years' duration; has made rapid progress during last three years; measured 5 in. by 3; ulcerated and fungating at centre; freely moveable on muscles; surface tuberculated, raised, and indurated; surrounding infiltration slight.
- Removed. Removed antiseptically with part of subjacent fascia; edges of wound approximated by button stitches. Wound remained sweet, and healed by granulation in 73 days. On examination the growth was found to be of warty rather than epitheliomatous nature. The epithelial cells were confined to the surface, and the hard base was composed of small round cells and cicatricial tissue.
- Sarcoma of the face and parotid. *3. a. Sarcoma of the Face.*—Mahomedan female, æt. 9. Admitted with a tumour of the size of an orange, of one month's growth, implicating the right side of the face, the ear, and the parotid region. It was soft, very vascular, ill-defined, and not moveable. General health bad. An exploratory incision was made, and the tumour was found to implicate the parotid gland and mastoid process. It was cut and scraped away, bleeding points secured, and chloride of zinc paste applied (equal parts of flour and chloride of zinc) to the surface of the wound, to stop oozing and destroy the remains of the tumour. She died of primary shock in the afternoon of the day of operation.
- Partial removal.
- Death.

b. Sarcoma of Lower Jaw.—Hindu, æt. 45 ; of bad constitution. Five months' duration ; right half of lower jaw. Removed by incisions from angle of mouth and through middle of lower lip and chin ; found to have involved palate and fauces and spread along temporal and pterygoid muscles into temporal, zygomatic, and pterygoid fosse. Part of upper jaw removed. External carotid artery tied. Died of pneumonia in two days. CHAP. IX.
VI. A. 3. b. c.
Extensive disease of jaws.

c. Sarcoma of Pharynx.—i. Eurasian male, æt. 33. Large tumour of pharynx of six months' duration ; consisted of two lobes—one springing from left tonsil, the other attached to posterior wall of pharynx and occupying left half of soft palate as far forwards as the edge of hard palate. Uvula displaced to right side. Aperture of fauces greatly contracted ; considerable difficulty in talking and swallowing ; tumour seemed to be confined to the pharyngeal wall and left pillars of fauces ; tongue not implicated. Laryngotomy performed as a preliminary, and tube inserted, through which chloroform was administered. Mucous membrane divided by scissors and probe-pointed bistoury ; tumour separated from surrounding tissue by finger and detached by chain écraseur. Portions which remained behind removed by scissors. Tube removed after 24 hours. Patient fed through a tube for a month. Parts diligently gargled with Condyl's fluid ; wound granulated and healed in 51 days. Uvula was drawn to left side. He was able to speak clearly and swallow comfortably ; no sign of recurrence manifest when he left hospital. Tumour of pharynx.
Preliminary laryngotomy.
Extirpation.
Recovery.

ii. Same patient returned 75 days after discharge with a recurrence of the tumour. Remained well for a month, when a painful swelling of the throat and left parotid region appeared. A piece of slough separated from the region of the left tonsil, but a tumour remained, which was felt to have a smooth rounded surface between the sterno-mastoid and ramus of the jaw. It was pretty moveable, and no enlarged glands could be discovered. It was determined to attempt its removal from without. A semi-lunar incision about two inches long was made behind the ramus and angle of the lower jaw, the skin and platysma myoides were cut through, and the external jugular vein exposed and ligatured in two places, and then cut. The deep fascia was divided Severe operation.

H

CHAP. IX.

VI. A. 3. c. d.

and the sterno-mastoid exposed. The facial artery and vein were ligatured and divided; the posterior belly of the digastric and the stylo-hyoid muscles dissected, caught in a catgut loop and held out of the way. The mouth was thrown open by a Smith's gag; the external carotid artery tied and held aside. The tumour was then felt through the wound, which was enlarged by a downward incision at right angles to the first. The tumour was separated by finger and scissors, care being taken to cut in the sound structures outside of it, vessels being promptly tied, as they bled, by catgut ligatures, the ends of which were left long for drainage. All suspicious mucous membrane was removed by scissors and the morbid mass thoroughly taken away. The wound healed kindly by granulation, and was superficial in a fortnight. The patient was fed with a tube for 18 days, and was then able to swallow. He left hospital in good health 35 days after the operation, with a sound T-shaped cicatrix on the left side of his neck.

Recovery.

Remarks.

This man underwent both of these formidable operations very successfully. Fuller details of them will be found in the *Indian Medical Gazette*, vol. xvi., 1881, pp. 146, 232. I saw him again seven months after last discharge from hospital. There was no recurrence of the growth in the pharynx. He was able to talk distinctly and swallow well, but there was a diffuse infiltration below the left ear about the origin of the sterno-mastoid muscle, which formed a swelling and impeded the opening of the mouth. This swelling subsided somewhat after being painted with iodine, but there was every reason to fear that the tumour had recurred, and in such a way as to preclude any further operative interference. This suspicion proved to be correct: the poor man's death was reported some weeks afterwards.

Recurrence.

Death.

Deep tumour of neck.

Removal.

Death.

d. Sarcoma of Neck.—i. Mahomedan male, æt. 16. Nine months' duration; of glandular origin; round-celled sarcoma attached to transverse process of atlas. Removed antiseptically. Patient very restless; putrefaction gained access to wound cavity; died of pyæmia in nine days. Full

details of this case are given in the *Indian Medical Gazette*, vol. xiv., 1879, page 161. CHAP. IX.

ii. Hindu female, æt. 30. Five or six years' duration; growing rapidly of late; right side of neck, beneath lower jaw. Removed by deep dissection. Recurred on two occasions. Second and third operations—one extirpating parotid gland. Recurred a fourth time; nothing further could be done, and patient left hospital with the growth rapidly increasing in the cicatrix. VI. A. 3. d.
Tumour of neck.
Three operations.
Recurrence.

iii. Mahomedan male, æt. 16. Tumour said to have commenced a month ago, as a nodule, under the angle of the lower jaw, right side. Had undergone very rapid increase; is situated in the anterior triangle, pushing the larynx to the left, extending behind body of lower jaw, and forming a swelling in the pharynx, fungating externally. Surrounding tissues cedematous; outline of tumour ill defined; very sparingly moveable. No enlarged glands; general health poor; no specific history. Suffers much from dyspnœa and dysphagia; face livid; asphyxiation imminent. Trache- Large diffuse tumour of neck.
Tracheotomy. otomy performed on admission: great relief experienced: colour was restored and dyspnœa subsided; tube left in for a week, and then removed. Had to be reinserted after another week for renewed dyspnœa. The tumour became more defined after the edema subsided. Two abscesses formed—the one in the left groin the other in the left buttock. They were opened, and healed kindly. New nodules began to grow in the neighbourhood of the tumour, and the consent of the patient's guardians having been obtained, an attempt was made to extirpate the tumour 39 Removal of tumour. days after the tracheotomy. Chloroform was administered through the tube. The skin was divided by a triangular incision, whose base was parallel to the lower border of the lower jaw, outer side to the sterno-mastoid, and inner to the middle line. After a prolonged and intricate dissection, during which the patient ceased to breathe and artificial respiration had to be resorted to, the mass was thoroughly extirpated. Part of the sterno-mastoid and the submaxillary gland were removed and the facial, superior thyroid and lingual vessels tied; preliminary ligation was resorted to in separating the deep attachments. The carotid sheath was not involved. The lower jaw was laid bare, and subsequently

CHAP. IX. VI. A. 3. d. Recurrence.	an exfoliation separated from it. The wound was left open and dressed with boracic gauze. It filled up with granulation material, and contracted to some extent; but the growth recurred and a similar tumour appeared in the upper part of the right thigh. Patient emaciated, and died of exhaustion 69 days after the operation.
Remarks.	This patient's life was undoubtedly saved for the time by the tracheotomy. The removal of the tumour was resorted to as the only chance of saving a young life. The operation was extremely difficult and formidable, but recovery took place from the immediate effects of it, and repair of the parts was in progress when local and remote recurrence took place. Further operation could not be recommended, and patient yielded his life very slowly by a process of emaciation and asthenia probably due to secondary visceral deposits. A post-mortem examination was not permitted. The sarcoma was of the small round-celled variety.
Deep tumour of neck.	iv. Mahomedan male, æt. 45. Infiltrating tumour of the right side of the neck, of eight months' duration, situated below sterno-mastoid, and extending from the anterior border of the trapezius to near the middle line; very hard; skin moveable over it. Seemed to be circumscribed, and
Removal.	was capable of being moved as a mass. Exposed by an incision in the line of the sterno-mastoid, part of which had to be removed. Carotid artery and internal jugular vein were imbedded, and were tied above and below. Pneumo-gastric nerve dissected out of the tumour. Died of shock six hours after the operation.
Death.	The tumour was found to be a large spindle-celled sarcoma, apparently of glandular origin, and implicating the carotid sheath and right lobe of the thyroid body.
Soft tumour of neck.	v. Hindu male, æt. 40. Fluctuating swelling, of three months' duration, on left side of neck; skin tense, red and shining; had been punctured and a quantity of sanious fluid let out; lymphatic glands on both sides of the neck enlarged. Respiration and deglutition impeded. An incision was made under antiseptic precautions, and a lot of
Incision.	

curdy sanious matter evacuated; a drainage tube was inserted. The cavity inflamed, and to relieve tension another incision was made. The base of the cavity meantime became broader and harder, and deep infiltration of the neck proceeded. As the tumour was obviously a soft sarcoma and beyond the reach of safe or thorough removal, no further step was taken, and patient was allowed to go home.

CHAP. IX.

VI. A. 3. c.

Extension.

e. **Sarcoma of Back.**—i. Hindu female, æt. 20. Admitted 30th January. Large hemispherical tumour of one year's growth on centre of back, caused by injury. Removed antiseptically by single incision. Left hospital with sound linear cicatrix in 46 days.

Large tumour of back.

Removal.

ii. Re-admitted on 18th September. Tumour re-appeared 1½ month ago. Three distinct masses existed in neighbourhood of former cicatrix. They were removed, with a liberal margin of surrounding skin and tissue, under antiseptic precautions. Wound healed by granulation. Discharged in 94 days with sound cicatrix. A small growth appeared in the track of one of the button stitches, which attained the size of a marble. Has not been heard of since she left hospital.

Recurrence.

Second operation.

Recovery.

iii. Hindu male, æt. 46. Had a tumour (fibro-sarcoma) removed from his back in 1880; remained well for four months, when a new growth started at the site of the old. This continued to increase rapidly. Re-admitted, and second operation performed eleven months after first. It was found to implicate the spinal column, and it became necessary to remove the arches of the last two dorsal vertebrae. Under antiseptic management the wound progressed favourably, but wasting, paralysis, and bedsores supervened, and death occurred from exhaustion 91 days after the operation. The tumour was found to be a sarcoma. Secondary deposits were discovered in the liver and lungs, and the bodies of the 12th dorsal vertebrae, and 2nd, 4th, and 5th lumbar, were found to have been completely decalcified and converted into fibrous tissue of an embryonic type.

Large tumour of back.

Recurrence.

Removal.

Death.

Diseased vertebrae.

Full details of this interesting case are given in the *Indian Medical Gazette*, vol. xvi., 1881, p. 315.

f. **Sarcoma of the Sole of the Foot.**—Irishwoman,

CHAP. IX.

VI. A. 3. b.

Recurrent
tumour of sole.
Successful
removal.

æet. 55. Tumour of seven years' growth, removed two years ago, recurred in two months. Fungating, moveable. Removed by elliptical incision, portion of tendon of flexor longus pollicis, which seemed to be diseased, also taken away. Wound remained aseptic, and healed by granulation in 64 days. Was able to walk with the aid of a stick when she left hospital.

Malignant
tumours com-
mon in Bengal.

Comment.—Malignant tumours are of very common occurrence among the natives of Bengal. In addition to the 48 cases included in this chapter, three cases of cancer and five of epithelioma underwent amputation, rendering an aggregate of 56 cases, of which 38 were cancer and 18 sarcoma. This by no means represents the number of persons who applied for relief on account of malignant disease during the period embraced by these returns. Very many sought assistance when the disease had reached a stage at which operative interference was hopeless. My experience in private practice entirely confirms the conclusion drawn from hospital statistics—a conclusion which is at variance with the teaching of some text-books in surgery. Reference to Appendix A shows that malignant disease is also very common in other parts of the Bengal Presidency. The diagnosis of the tumours under comment was verified and confirmed by careful microscopic examination conducted by Surgeon-Major J. F. P. McConnell, M.B., Professor of Pathology, and this remark applies equally to all the tumours included in these statistics. The varieties of cancer operated on were scirrhus and epithelioma—the former occurring in the female breast and the latter in the integument and oral cavity. In all the breast cases it was found necessary to remove the axillary glands. The subjects of operation were for the most part feeble and cachectic, and the disease in an advanced state. The death-rate was consequently very high. Some of the cases of epithelioma were also very serious, requiring severe operations for the

Microscopic
identification
of tumours.

Cancer of
breast.

extirpation of the disease. The penis is a very common site of cancerous disease among natives. There is generally in these cases a history of venereal ulceration. The method of operation resorted to in these cases was that known as Hilton's; the corpus spongiosum being dissected out and divided at a lower level than the corpora cavernosa. This plan prevents retraction of the urethra, and gives a more satisfactory result than the method of transverse incision. When the skin of the penis was sufficiently healthy to admit of it, oval flaps were cut, and the urethra, after having been slit up to the extent of a quarter of an inch, and its lips pared, obliquely stitched to the lower angle of the wound. The expedient described in case viii., for the purpose of stopping bleeding from the divided erectile tissue, was found to work well. The majority of the cases of sarcoma were in an advanced stage, requiring dangerous operations for the removal of the disease. In many of the cases, notwithstanding repeated and what appeared to be radical removal of the disease, recurrence took place either regionally or remotely, and eventually put an end to the patient's life. Operation in this class of cases is both hazardous in execution and disappointing in result.

CHAP. IX.

Epithelioma
of penis.Mode of
amputating.Unsatisfactory
result of opera-
tions for
sarcoma.

CHAPTER X.

B. NON-MALIGNANT TUMOURS.

Cases, 205 ; Deaths, 35.

1. a. ELEPHANTIASIS OF PREPUCE.

Cases, 2 ; Deaths, 0.

VI. B. 1. a.
Elephantiasis
of prepuce.

i. Hindu male, æt. 32. Phimosis from childhood, partial phimosis for five months, causing elephantoid swelling of the prepuce beyond the constriction. This was removed, the wound healed by granulation, and patient was discharged in 24 days.

Ditto.

ii. Hindu male, æt. 20. Hard chancre two months ago; partial circumcision $1\frac{1}{2}$ month ago. Portion of prepuce left behind had undergone great elephantoid thickening. It was excised, and patient was discharged in 32 days with a sound soft cicatrix above the corona glandis.

b. ELEPHANTIASIS OF SCROTUM.

Cases, 129 ; Deaths, 23.

SERIES (a). UNCOMPLICATED.

Cases, 92 ; Deaths, 8.

Hydrocele.

i. Hindu, æt. 32. Two years' duration. Preceded by hydrocele, which was tapped and injected four years ago; general health good; 8 lbs. Recovered. Discharged in 67 days. (Dr. Palmer.)

ii. Hindu, æt. 32. Six months' duration; general health good; 1 lb. Recovered. Discharged in 48 days. (Dr. Palmer.)

iii. Hindu, æt. 37. Three years' duration; general health good; 1 lb. Recovered. Discharged in 95 days. (Dr. Palmer.)

iv. Mahomedan, æt. 45. Three years' duration; general health bad; 1 lb. Recovered. Discharged in 38 days. (Dr. Palmer.)

v. Hindu, æt. 20. Four years' duration; general health good; 1 lb. Recovered. (Dr. Palmer.) CHAP. X.

vi. Hindu, æt. 58. Hydrocele fifteen years ago. The tumour began to grow a year and a half ago; weight, 10 ozs. On the fourteenth day of operation had erysipelas, which disappeared after eleven days. Recovered after 92 days. Had enlargement of spleen. VI. B. 1. b.
Hydrocele.
Erysipelas.
Spleen.

vii. Hindu, æt. 29. Duration, two years. Prepuce considerably hypertrophied. Weight, 12 ozs. Washed with chloride of zinc lotion (40 grs. to 1 oz.). The whole wound got covered with deep sloughs. The right testicle was destroyed. The left was quite loose at first, but became adherent after a few days. General health indifferent. Discharged after 96 days. Sloughing
from applica-
tion of chloride
of zinc.

viii. Hindu, æt. 25. Duration, four years. Elephantoid thickening of mons veneris and lower part of the abdomen. A slight collection of fluid in the left tunica; weight, 2 lbs. 8 ozs. Had erysipelas on the eighth day of the operation; recovered after 15 days. Discharged after 64 days. The swelling of the pubis subsided to a considerable extent. Hydrocele.
Erysipelas.

ix. A Hindustanee, æt. 50. Duration, fifteen years. Admitted with suppuration of the right tunica: weight, 2 lbs. 8 ozs. The right tunica thickened and contained purulent and sloughy material; had hæmorrhage from the wound; suffered from collapse for more than twenty-four hours. General health very good. Recovered after 73 days. Abscess of
tunica.
Hæmorrhage.

x. Hindu, æt. 40. Duration, two years. Both legs swollen; general health good; no organic mischief; weight, 3 lbs. 4 ozs. Lost about 8 ozs. of blood from inefficiency of the elastic cord; the right tunica thickened and almost cartilaginous; the left one healthy. There were symptoms of prostration for a few days. Discharged after 79 days. Elephantiasis
of legs.
Diseased
tunica.

xi. Hindu, æt. 35. Duration, ten years; health very good; weight, 2 lbs. 10 ozs. Had hydrocele of both tunicae, which had been cured by iodine injection. No collection of fluid in them. Discharged in 72 days. Hydrocele.

xii. A native, æt. 35. Duration five years; health indifferent; weight, 2 lbs. 4 ozs. Hydrocele on both sides. Recovered in 58 days. Hydrocele.

xiii. A native, æt. 37. Duration, eight years; countenance anæmic; not very well nourished; weight, 3 lbs. 2 ozs. Hydrocele on the left side. The right tunica of cartila- Hydrocele.

- CHAP. X.
VI. B. 1. b.
Death.
Diseased
tunica.
- ginous hardness. On the seventh day of the operation had secondary hæmorrhage from the wound. Died on the tenth day, exhausted.
- xiv. Native, æt. 40. Duration not known by the patient. The growth had been rapid for five months. General health not good. Had chronic bronchitis. Weight 1 lb. 8 ozs. Both tunicæ thickened. Recovered.
- Spleen and
liver.
- xv. Mahomedan, æt. 31. Duration, six years; health bad. Had enlargement of spleen and liver (chronic), and chronic bronchitis. Was kept under tonic treatment for 44 days. Then the tumour was removed; weight, 8 lbs. 3 ozs. A large hydrocele on the left side, a small one on the right. Had inflammation of the right cord (simulating erysipelas). Discharged after 78 days.
- Hydrocele.
- Elephantiasis
of legs.
- xvi. Mahomedan, æt. 35. Duration, five years. Both legs thickened; health good; weight, 7 lbs. 3 ozs. Large hydrocele on the left side; a small on the right side. Discharged cured in 106 days.
- Hydrocele.
- xvii. A Hindustanee, æt. 32. Duration, five years; general health good; weight, 5 lb. 2 ozs. Penis imbedded. On the ninth day of the operation there was erysipelatous redness over the abdomen. Had persistent hiccough, and died on the 14th day of the operation.
- Erysipelas.
Death.
- xviii. Hindu, æt. 23. Duration, said to be one year and a half; general health good; weight, 6 ozs. Hydrocele of right tunica. Cured in 54 days.
- Hydrocele.
- Enlarged
lymphatics.
- xix. Hindu, æt. 23. Duration, five years. Well nourished; no organic complication. The tumour traversed by lymph channels; weight, 2 lbs. 9 ozs. Testicles healthy. Discharged in 71 days.
- Lymph
scrotum.
- xx. East Indian, æt. 31. Duration, three months. The scrotum had a mammillated appearance; clear lymph containing filariæ came out in a stream on puncturing the lymph channels. Sound health; no organic mischief; weight, 10 ozs. Cured in 79 days.
- Filarie.
- xxi. Hindu, æt. 48. Twelve years' growth; enormous tumour; general health fair; addicted to drink. Excised bloodlessly; 85 vessels tied; very little shock; secondary hæmorrhage, 9th, 10th, and 11th days. Diarrhoea, vomiting, and exhaustion. Died 15 days after operation; tumour weighed 96 lbs.
- Enormous
tumour.
- Death

- xxii. Hindu, æt. 28. Four years' duration. Excised blood-
lessly; hydrocele on both sides; 35 vessels tied. Wound
suppurated; suffered a good deal from fever. Discharged
in 82 days. Weight 12 ozs. CHAP. X.
VI. B. 1. b.
Hydrocele.
- xxiii. Hindu, æt. 55; 25 years' duration. Hydrocele of
left testicle. Removed bloodlessly; 36 vessels tied. Wound
putrefied; fever for ten days; left hospital in 76 days
Weight, 8 lbs. 8 ozs. Hydrocele.
- xxiv. Hindu, æt. 36. Four years' duration. Small hydro-
cele on both sides. Excised bloodlessly; 35 ligatures used;
wound putrefied. Suffered from hiccough for two days.
Had a good deal of fever. Discharged in 80 days. Weight,
1 lb. 5 ozs. Hydrocele.
- xxv. Eurasian, æt. 32. Four years' duration. Has also
elephantiasis of right leg. General health good. Removed
in the usual way. Hydrocele of both testes. The operation
was followed by severe sloughing cellulitis of the abdominal
wall and gluteal region, accompanied by fever of a low type.
Free incisions were required. Recovery eventually took
place. Left hospital in good health, with wound soundly
cicatrised, in 108 days. Elephantiasis
of leg.
Hydrocele.
Cellulitis.
- xxvi. Hindu, æt. 40. Seventeen years' duration. General
health good. Removed in the usual way; tunica adherent.
Forty ligatures used. Progress satisfactory. Discharged
in 38 days. Weighed 4 lbs. Adherent
tunica.
- xxvii. Hindu, æt. 40. Five years' duration. History of
injury; no venereal disease; health good. Removed in
the usual way. Double hydrocele; testes stitched with cat-
gut to each other and to edge of wound. Dressed antisepti-
cally. Putrefied, became aseptic in four weeks. Discharged
in 65 days. Weighed 3 lbs. 2 ozs. Hydrocele.
Stitching of
testes.
- xxviii. Mahomedan, æt. 45. Nine years' duration. Spleen
and liver enlarged and right leg elephantoid. Removed in
the usual way. A little fluid in both tunica; testes stitched
as in No. xxvii. Dressed antiseptically under the
spray; wound putrefied and suppurated; secondary hæmorrhage.
Sinus formed behind and between testes; suffered
much from fever; wound eventually became sweet and
cicatrised. Discharged in 85 days. Weighed 3 lbs. 4 ozs. Spleen and
liver.
Hydrocele.
Hæmorrhage.
- xxix. Mahomedan, æt. 32. Five years' duration; fever and
enlarged spleen. Removed and dressed as in case xxviii. Spleen.

- CHAP. X.
VI. B. 1. 6.
- Remained aseptic; no suppuration; dressings changed for a fortnight, then less frequently. Discharged in 62 days. Weighed 1 lb. 3 ozs.
- Syphilis. xxx. Hindu, æt. 50. Eight years' duration. History of gonorrhœa and syphilis; health good. Removed under spray as in case xxviii. Fluid in left tunica; right adherent; skin freed laterally, and brought over testes. No putrefaction, inflammation, or fever. Discharged in 62 days. Weighed 2 lbs. 2 ozs.
- Syphilis. xxxi. Hindu, æt. 35. Two years' duration. History of hydrocele, phimosis, and chancre. Operation as in case xxviii. Hydrocele. Secondary hæmorrhage on second day. Wound putrefied. Secondary fever. Discharged in 70 days. Weighed 1 lb. 6 ozs.
- Syphilis. xxxii. Hindu, æt. 25. Four years' duration. History of hydrocele, fever, and chancre. Operation as in case xxviii. Hydrocele. hydrocele of right testicle. Wound remained sweet, and healed kindly without suppuration. Discharged in 73 days. Weight, 2 lbs. 6 ozs.
- Hydrocele. xxxiii. Hindu, æt. 30. Eight years' duration. History of hydrocele and sloughing of left scrotum; hydrocele of right side. Removed under strict antiseptic precautions. Flaps cut from thighs; testes stitched to each other and to surface of perineal wound: flaps brought together over them. Remained sweet; very little fever. Discharged in 70 days. Weighed 6 lbs. 2½ ozs.
- Flaps. xxxiv. Hindu, æt. 25. Five months' duration. Operation as in case xxxiii. Wound remained aseptic. Discharged in 74 days. Weighed 7 ozs.
- Hydrocele. xxxv. Hindu, æt. 35. Thirteen years' duration. History of hydrocele. Operation as in case xxxiii. Double hydrocele. No putrefaction, inflammation, suppuration, or fever. Discharged in 63 days. Weighed 9 lbs. 12 ozs.
- Erysipelas. xxxvi. Hindu, æt. 20. Five years' duration. Operation as in case xxxiii. Putrefied on fourth day. Suffered from erysipelas and fever. Wound subsequently became aseptic. Discharged in 65 days. Weighed 6 ozs.
- Spleen and liver. xxxvii. Mahomedan, æt. 32. Four years' duration. History of fever and hydrocele. Slight enlargement of spleen and liver. Operation as in case xxxiii. Wound putrefied in second week, and became aseptic in about seventeen days. Discharged in 72 days. Weighed 1 lb. 9 ozs.

xxxviii. Hindu, æt. 32. Three years' duration. Lymph CHAP. X.
scrotum. Scrotum removed antiseptically; testes stitched VI. B. 1. b.
as in xxxiii.; lateral flaps brought over them and stitched Lymph
together with catgut; penis healthy, not decorticated. scrotum.
Wound remained sweet and was healing kindly; got lymph-
angitis of both arms on seventh day, and pleurisy on
thirteenth. Died fourteen days after operation of pleurisy Death.
and pericarditis. Weighed 11 ozs.

xxxix. Hindu, æt. 34. Four years' duration. Health Hamatocele.
good. Operation as in case xxxiii. Hamatocele of left
tunica. Temporary putrefaction from fourth to fifteenth
day. Flaps adhered and wound granulated satisfactorily.
Discharged in 72 days. Weighed 2 lbs. 11 ozs.

xl. Hindu, æt. 25. Two years' duration. Health good. Hydrocele.
Operation as in case xxxiii. Double hydrocele. Wound
putrefied; suffered from fever, dysentery, and cutaneous Erysipelas.
erysipelas. Wound eventually healed kindly, and flaps
retained their vitality, and formed a good covering for the
testes. Discharged in 75 days. Weighed 1 lb. 11 ozs.

xli. Hindu, æt. 25. Ten months' duration. History of Syphilis.
gonorrhœa and chancre. Health good; operation as in
case xxxiii. Secondary hæmorrhage and putrefaction Hæmorrhage.
occurred, accompanied by high fever; suffered also from
bronchitis. Wound subsequently rendered aseptic. Dis-
charged in 67 days. Weighed 6 ozs.

xlii. Hindu, æt. 40. Five years' duration. General
health good; very fat. Operation as in case xxxiii.
Rallied badly. Secondary hæmorrhage within 24 hours, Hæmorrhage.
succeeded by obstinate vomiting; flaps inflamed on third
day, and were covered with bullæ. Got high fever, and Gangrene.
died of exhaustion three days after operation. Weighed Death.
5 lbs. 11 ozs.

xliii. Hindu, æt. 25. Eight years' duration. Health Hydrocele.
good. Operation as in case xxxiii. Double hydrocele.
Discharged in 73 days. Weighed 4 lbs. 14 ozs.

xliv. European, æt. 48. Four years' duration. History Gonorrhœa.
of gonorrhœa and phimosis. General health good; addicted
to drink. Removed bloodlessly, but not antiseptically.
Hydrocele of left tunica. Wound putrefied and suppurated. Hydrocele.
Discharged in 120 days. Weighed 1 lb. 3 ozs.

xlvi. Hindu male, æt. 17. Two years' duration. Slight

- CHAP. X.
VI. B. 1. b.
Spleen.
- enlargement of spleen. Health otherwise good. Penis unaffected; not decorticated. Scrotum removed under antiseptic precautions. Testes stitched together and to surface of wound by catgut; lateral flaps brought together over them by continuous catgut suture. Healed in 58 days. Tumour weighed 6 ozs.
- xlvi. Hindu male, æt. 19. Four months' duration. Health good. Removed antiseptically; flaps taken from thigh to cover testes, which were stitched together as in case xlv. Left hospital 60 days after operation. Tumour weighed 12 ozs.
- Hydrocele.
- lxvii. Hindu male, æt. 35. Six years' duration; large double hydrocele. Removed bloodlessly and antiseptically; flaps taken from thighs; testes stitched as in case xlv. Discharged in 64 days. Tumour weighed 3 lbs. 10 ozs.
- Hydrocele.
- lxviii. Mahomedan male, æt. 32. Twelve years' duration. History of hydrocele on both sides; health good. Tumour removed bloodlessly and antiseptically; flaps taken from thighs and testes stitched. Tunicae adherent to testes. Right contained a large quantity of jelly-like lymph. Wound remained aseptic. Discharged in 94 days. Tumour weighed 1 lb. 11 ozs.
- Dilated lymphatics.
- lix. Hindu male, æt. 40. One year's duration. Back of dilated lymphatics on fundus. Tumour removed antiseptically; tunicae found adherent to testes. These were stitched together and placed in pockets which were formed by separating the deep layer of the superficial perineal fascia from the subjacent structures. The lateral flaps so formed were stitched by continuous catgut suture over the testes. Wound remained aseptic and healed in 71 days. Weight of tumour, 13 ozs.
- Pockets.
- Syphilis.
- l. Hindu male, æt. 26. Four years' duration. History of syphilis eight years ago; admitted in an inflamed condition; on the inflammation subsiding an operation was performed as in case lix. Repair took place satisfactorily in 64 days; an abscess formed in right groin, which was opened antiseptically and healed in a few days. Slight hydrocele existed on both sides. Tumour weighed 13 ozs.
- Hydrocele.
- li. Hindu male, æt. 55. Twenty years' duration. Operation as in case lix.; wound remained aseptic, and was progressing satisfactorily when tetanus supervened on the
- Tetanus.

eight, and carried the patient off on the ninth day after operation. Tumour weighed 3 lbs. 8 ozs. CHAP. X.

lii. Hindu male, æt. 22. Four years' duration; history of gonorrhœa and double bubo; general health good. Operation as in case xlix. Pursued an aseptic course. Discharged 45 days after operation. Tumour weighed 8 ozs. VI. B. I. b.
History of
bubo.

liii. Mahomedan male, æt. 28. Three years' duration; history of gonorrhœa followed by orchitis. Hydrocele on right side. Tumour removed as in case xlii. Repair progressed satisfactorily. Discharged in 97 days. Cicatrization of penis slow. Tumour weighed 2 lbs. 4 ozs. Gonorrhœa.
Hydrocele.

liv. Hindu male, æt. 45. Twenty years' duration; history of hydrocele. Health good. Removed as in case xlix. Wound remained aseptic, and healed in 49 days; tunicae adherent to testes; lymphatic beads on scrotum; lining membrane of prepuce left behind. It became cedematous, and then thickened. Tumour weighed 2 lbs. 1 oz. Adherent
tunica.
Dilated
lymphatics.

lv. Hindu male, æt. 41. Three years' duration; history of double hydrocele, which was tapped and injected. Operation as in case xlix.: tunicae adherent to testes; suffered from high fever and smoky urine preceded by roseolar eruption for five days. Carbolic dressings discontinued; iodine irrigation and boracic dressings used. Wound continued aseptic, and healed satisfactorily in 37 days. Tumour weighed 14 ozs. Hydrocele.
Roseola.

lvi. Mahomedan male, æt. 37. Lymph scrotum of three years' duration. History of orchitis, double hydrocele, and periodical fever. Scrotum covered with vesicles (dilated lymphatics) discharging a clear or pinkish fluid on being pricked. Redundant and thickened scrotal skin removed, skin of penis left, testes stitched together and covered with flaps drawn from the sides. Operation performed under strict antiseptic precautions. Wound remained sweet, and healed in 33 days, leaving a linear cicatrix. Tumour weighed 15 ozs. Lymph
scrotum.
Hydrocele.

lvii. Mahomedan male, æt. 50. Eight years' duration. Syphilis. Syphilis twenty years ago. History of gonorrhœal orchitis and fever; lymph vesicles on surface of scrotum. Tumour removed under antiseptic precautions. Pockets dug for testes, which were stitched together and to the surface of Dilated
lymphatics.

CHAP. X.

VI. B. 1. b.

the perinaeum; lateral flaps stitched over them by continuous catgut sutures. Testes adhered to each other and to flaps. Large abscess formed in right groin. Penis freed with scissors on two occasions. Final result satisfactory. Remained in hospital 77 days. Tumour weighed 10 lbs.

Dilated lymphatics.

Elephantiasis of legs.
Hydrocele.

lviii. Hindu male, æt. 32. Ten years' duration. History of orchitis and periodical fever. Lymph vesicles on scrotum. Elephantiasis of both legs. Operation as in case lvii. Double hydrocele; wound putrefied and flaps partially sloughed. Suffered from carbolic poisoning. Secondary operation necessary for removal of thickened perinaeum. Penis freed by scissors on three occasions. Final result satisfactory. Discharged in 114 days. Tumour weighed 23 lbs.

Lymph scrotum.

lix. Mahomedan male, æt. 38. Lymph scrotum of ten years' duration. History of periodical fever. Skin of penis healthy. Scrotal skin removed as in case lvii. Suppuration occurred in each groin, which delayed recovery. Wound healed in 31 days. Tumour weighed 5 ozs.

Dilated lymphatics.

lx. Mahomedan, æt. 20. Four years' duration. History of inflammation and fever; vesicles on scrotum. Excised as in case lvii. Remained aseptic; excellent result. Discharged in 63 days. Tumour weighed 13½ ozs.

Diseased tunica.

lxi. Hindu, æt. 43. Twelve years' duration. History of periodical fever and sloughing. Excised as in case lvii. Right tunica thickened and cartilaginous, contained about 5 ozs. of fluid. Wound remained sweet. Satisfactory result in 70 days. Tumour weighed 8 lbs.

Adherent tunica.

lxii. Hindu, æt. 36. Six years' duration. Occasional fever. Removed as in case lvii. Tunica partially adherent. Wound remained aseptic. Discharged in 72 days. Tumour weighed 7 lbs. 7 ozs.

Diseased tunica.

lxiii. Hindu, æt. 37. Two years' duration; periodical fever. Removed as in case lvii. Tunica inflamed. Wound remained sweet, but repair slow, owing to inflamed state of parts. Discharged in 92 days. Tumour weighed 1 lb.

Hydrocele.

lxiv. Mahomedan, æt. 32. Two months' duration. History of inflammation and fever. Removed as in case lvii. Hydrocele on both sides. Wound remained aseptic, considerably swelled. Good result in 72 days. Weighed 14 ozs.

lxv. Hindu, æt. 21. One month's duration. History of gonorrhœa and syphilis. Secondary eruptions. Removed as in case lvii. Double hydrocele; wound putrefied; burrowing took place in left groin. Recovery slow. Final result good. Discharged in 135 days. Tumour weighed 1 lb. 4 ozs. CHAP. X.
VI. B. 1. b.
Syphilis.
Hydrocele.

lxvi. Hindu male, æt. 38. One year's duration. Vesicles on scrotum; syphilis two months ago. Excised as in case lvii. Wound remained aseptie. Cicatrisation of penis slow. Remained 97 days in hospital. Tumour weighed 1 lb. $\frac{1}{2}$ oz. Dilated lymphatic.
Syphilis.

lxvii. East Indian, æt. 30. Four years' duration. History of orchitis and fever. Operation as in case lvii. Wound remained aseptie and underwent satisfactory repair. Cicatrisation of penis tedious. Remained 90 days in hospital. Tumour weighed 3 lbs. 6 ozs. Orchitis.

lxviii. Hindu, æt. 35. Three years' duration. History of gonorrhœa, phimosis, and periodical fever. Operation as in case lvii. Wound remained aseptie. Good result in 68 days. Tumour weighed 2 lbs. 8 ozs. Gonorrhœa.

lxix. Hindu, æt. 40. Ten years' duration. History of orchitis and periodical fever. Operation as in case lvii. Wound remained aseptie and healed without suppuration. Remained 72 days in hospital. Tumour weighed 1 lb. 6 ozs. Orchitis.

lxx. Mahomedan, æt. 40. Two years' duration. History of abscess of scrotum. Sinus at fundus of scrotum. Removed as in case lvii. Tunicae adherent on both sides. Wound remained sweet and healed kindly. Discharged in 90 days. Weight of tumour 8 lbs. 12 ozs. Abscess and sinus.
Adherent tunicae.

lxxi. Hindu, æt. 40. Eighteen months' duration. History of syphilis and periodical fever. Tumour removed as in case lvii. Wound remained aseptie and healed kindly. Discharged in 79 days. Tumour weighed 5 lbs. 6 ozs. Syphilis.

lxxii. Hindu, æt. 25. Five years' duration. History of hydrocele and periodical fever. Removed as in case lvii. Tunicae adherent. Wound remained aseptie and underwent satisfactory repair. Left hospital in 74 days. Tumour weighed 4 lbs. 12 ozs. Hydrocele.

lxxiii. Hindu, æt. 18. Ten years' duration. History of orchitis and fever. Operation as in case lvii. Wound remained sweet, and healed without hinderance. Discharged 71 days after operation. Tumour weighed 1 lb. 2 ozs. Orchitis.

- CHAP. X.
VI. B. 1. b.
Dilated lymphatics.
Hydrocele.
- lxxiv. Hindu, æt. 37. Five years' duration. History of inflammation and fever. Lymph vesicles on scrotum. Patient very fat; consumed about 60 grains of opium a day by smoking. Removed as in case lvii. Double hydrocele. Wound putrefied and suppurated. Lateral flaps melted away somewhat, and burrowing of matter took place in groins and thighs. Result eventually satisfactory. Left hospital in 90 days. Tumour weighed 5 lbs. 12 ozs.
- Dilated lymphatics.
Hydrocele.
Hæmorrhage.
- lxxv. Hindu, æt. 37. Eight years' duration. History of scrotal inflammation and periodical fever. Lymph vesicles on scrotum. Operation as in case lvii. Small double hydrocele. Secondary hæmorrhage on 2nd and 4th days. Stopped by ligature of bleeding points. Wound putrefied and suppurated, and burrowing of matter took place along left cord. Final result good. Discharged in 100 days. Tumour weighed 2 lbs.
- Sinus.
- lxxvi. Hindu, æt. 23. One year's duration. History of inflammation and periodical fever; deep sinus in fundus of scrotum; spleen much enlarged. Sinus healed under treatment. Another scrotal abscess formed, and was successfully treated by evacuating incision. Tumour excised as in case lvii. Wound remained aseptic. Result good. Discharged in 81 days. Tumour weighed 1 lb. 14 ozs.
- Spleen.
Abscess.
- Orchitis.
Hydrocele.
- lxxvii. Mahomedan male, æt. 20. Tumour of five years' duration. History of periodical fever, orchitis, and hydrocele, which was tapped and injected with iodine. Health good. Usual operation performed. Parts healed in 72 days. No constitutional disturbance. Tumour weighed 2 lbs. 1 oz.
- Syphilis.
- lxxviii. Hindu male, æt. 30. Tumour, involving both penis and scrotum, of one and a half year's duration. History of syphilis and periodic fever. Scrotum covered with cicatrices. Usual operation. Slight fever for two days. Wound was pursuing an aseptic course when tetanus set in five days after operation, and proved fatal next day. Tumour weighed 2 lbs.
- Tetanus.
Death.
- Syphilis.
- lxxix. Burmese male, æt. 25. Tumour, involving both penis and scrotum, of one year's duration. History of syphilis and periodic fever. Usual operation. Wound healed kindly and without constitutional disturbance, but an attack of syphilitic psoriasis detained him in hospital for 91 days after operation. Weight of tumour, 15 ozs.

lxxx. Hindu male, æt. 25. Tumour, involving both penis and scrotum, of one year's duration. History of syphilis, gonorrhœa and double suppurating bubo. Usual operation performed. Hydrocele on right side; testicle wanting on left. Got fever with rigor four days after operation, succeeded by sloughing of the wound and erysipelatous inflammation in its neighbourhood. This delayed recovery, and he remained 99 days in hospital. Tumour weighed 1 lb. 8 ozs. CHAP. X.
VI. B. 1. 6.

lxxxi. Hindu male, æt. 30. Tumour of penis and scrotum of two years' growth. History of periodic fever. Health good. Usual operation. Hydrocele on right side. Left testis atrophied. Complete and satisfactory recovery in 91 days. Tumour weighed 1 lb. Hydrocele.

lxxxii. Hindu male, æt. 45. Tumour of penis and scrotum of five years' duration. History of periodic fever. Surface of scrotum exudes fluid. Operation as usual. Double hydrocele. Wound remained aseptic and healed completely in 91 days. Tumour weighed 1 lb. 6 ozs. Hydrocele.

lxxxiii. Armenian male, æt. 42. Tumour, implicating both penis and scrotum, of five years' duration. History of periodic fever, hydrocele, syphilis, gonorrhœa, and bubo; parts inflamed on admission; treated for some time with lead locally and iodide of potassium internally. Usual operation performed. Had smart reactive fever, which subsided. Was doing well, when tetanus set in ten days after operation, and proved fatal in six days. Tumour weighed 1 lb. 8 ozs. Syphilis, &c.
Tetanus.
Death.

lxxxiv. Hindu male, æt. 40. Tumour of both penis and scrotum of three years' duration. History of periodic fever. Scrotum covered with vesicles containing lymph. Usual operation; hæmatocele on right and hydrocele on left side. Slight reactive fever. Recovered in 65 days. Tumour weighed 3 lbs. 1 oz. Dilated lymphatics.
Hydrocele.

lxxxv. Mahomedan male, æt. 50. Tumour involved both penis and scrotum, of one year's duration. History of syphilis and gonorrhœa in early life, and periodic fever accompanying growth of the tumour. Vesicles on scrotum. Usual operation. Slight reactive fever after it. Wound remained aseptic and healed in 61 days. Tumour weighed 1 lb. 4 ozs. Dilated lymphatics.

- CHAP. X.
VI. B. r. b.
Venereal sores.
Hydrocele.
- lxxxvi. Hindu male, æt 35. Hypertrophy of penis and scrotum of three years' duration. History of fever; venereal sores three years ago. Usual operation. Slight hydrocele on right side. Left tunica adherent. No fever after operation. Recovered in 59 days. Tumour weighed 6 lbs. 8 ozs.
- Bubo.
- lxxxvii. Mahomedan male, æt 30. Tumour, implicating penis and scrotum, of one and a half year's duration. Gonorrhœa and bubo ten years ago. Subject to occasional attacks of fever. Skin of scrotum scaly, occasionally exuding watery fluid. Usual operation. Double hydrocele. Slight reactive fever. Recovered in 56 days. Tumour weighed 10 ozs.
- Hydrocele.
- lxxxviii. Hindu male, æt 35. Hypertrophy of penis and scrotum of five years' duration. History of periodic fever and hydrocele. Usual operation. Very large hydrocele on right side, smaller on left. Slight reactive fever. Good result in 80 days. Tumour weighed 4 lbs. 6 ozs.
- Hydrocele.
- lxxxix. Hindu male, æt. 35. Tumour of scrotum of four years' duration. History of fever and double hydrocele; inguinal glands enlarged. Scrotum amputated. Double abscess of scrotum and tunica found; tunica pared down and operation completed as usual. Suffered from fever for a week. Made a good recovery in 61 days. Tumour weighed 1 lb. 7 ozs.
- Venereal sores.
- xc. Native Christian male, æt 50. Tumour involves both penis and scrotum; had venereal sore and suppurating bubo 25 years ago. History of fever. Usual operation; healed in 81 days. Tumour weighed 1 lb. 12 ozs.
- Recurrent tumour.
- xc. Native Christian male, æt. 45. The scrotum was amputated for elephantiasis by Dr. Gayer seven years ago. The prepuce has now got enlarged. This was removed by dissection and the wound allowed to heal by granulation, which took place in 25 days.
- Venereal sores.
- xcii. Hindu male, æt 50. Tumour of penis and scrotum of two years' duration. History of venereal sore, suppurating bubo and gonorrhœa, also of occasional fever. Skin of scrotum covered with vesicles discharging clear fluid. Usual operation. Satisfactory result in 75 days. Tumour weighed 1 lb. 6 ozs.
- Dilated lymphatics.

SERIES (b). COMPLICATED WITH ULCERATION AND SLOUGHING. CHAP. X.
Cases, 10 ; Deaths, 3. VL. B. I. b.

xciii. Hindu, æt. 32. Duration, nine years. Sloughing Sloughing.
of the scrotum had occurred ; both testicles protruding ;
looked anæmic ; fairly nourished. Weight, 12 ozs. Recovered
after 84 days.

xciv. A Hindustanee, æt 40. Six months' duration. Ulceration.
Ulceration at the root of the tumour. General health bad.
Weight, 2 lbs. Died six days after the operation, of Death.
exhaustion.

xcv. Mahomedan, æt. 20. Four years' duration. General Ulcers.
health bad ; ulcer on scrotum and elephantiasis of both legs. Elephantiasis
Operation as in case xxxiii. Hydrocele of right tunica. of legs.
Wound putrefied on 5th day. Secondary hæmorrhage on Hydrocele.
two occasions. Wound became aseptic in a week. Suffered
from fever and got sloughing dysentery, which carried him Dysentery.
off in seven days. Wound nearly healed. Died 32 days Death.
after operation. Weighed 4 lbs. 4 ozs.

xcvi. Hindu male, æt. 40. One and a half year's dura- Ulcers and
tion. Ulcer on fundus ; abscess on dorsum of penis. abscess.
Tumour removed antiseptically ; flaps cut from thighs ;
testes stitched. Healed in 34 days. Weighed 13 ozs.

xcvii. Native Christian male, æt. 40. Eight years' Syphilis.
duration. History of syphilis ; numerous ulcers on penis, Ulcers.
scrotum, and right leg. Operation as in case xlix. Tunica
adherent to right testis ; small hydrocele on left side. Hydrocele.
Wound remained aseptic, but healed slowly. Discharged in
102 days. Weighed 2 lbs. 6 ozs.

xcviii. Hindu male, æt. 30. Penis, scrotum, and pubis Serpigenous
covered with a large serpigenous ulcer of six years' duration, ulceration.
which commenced with a soft chancre. Scrotum enlarged
(elephantoid). Ulcer dissected off and thickened scrotum
removed ; penis dissected out of cicatricial mass ; flaps taken
from thigh and stitched over testes, which were also stitched
together and to surface of perineum. Operation performed
with antiseptic precautions ; flaps united, and wound, which
remained aseptic, healed kindly. Cicatrisation of penis very
tedious. Discharged in 123 days.

xcix. Hindu male, æt. 25. A large serpigenous ulcer on

CHAP. X:

VI. B. 1. b.
Serpigenous
ulceration.

scrotum, pubis, and groins, following chancre and bubo contracted four years ago; penis completely embedded in cicatricial mass; scrotum much thickened; edges of ulcer papillomatous. Ulcer dissected off, including the tuberculated edge, except from right groin; penis freed and thickened, scrotum removed; flap taken from left thigh; testes stitched as usual. Repair of the large wound very tedious. After a stay in hospital of 225 days he left with a sound cicatrix. Mass removed weighed $11\frac{1}{2}$ ozs.

Hernia testis.
Gonorrhœa.

c. Hindu, æt. 26; hernia testis of left side, with elephantoid swelling of scrotum. History of gonorrhœa and orchitis. Ablation of scrotum performed as in case lvi., skin of penis being left. Infiltrated substance of left testis protruded through a narrow opening in the tunica albuginea, which was freely notched; testes stitched together and enclosed in pockets as usual. Wound remained aseptic, and underwent slow but satisfactory repair. Discharged in 98 days. Tumour weighed 6 ozs.

Hernia testis.

Venereal sores.

ci. Hindu male, æt. 27. Admitted with hernia testis of left side, consequent on abscess of the tunica vaginalis and sloughing of the scrotum. Had destructive venereal sores on penis, which caused loss of most of its integument. Suffered also from gonorrhœa, which was succeeded by an abscess at the root of the penis, which, bursting, gave rise to a permanent fistula. Scrotal skin much thickened and covered with cicatrices. Scrotal integument removed by elliptical incisions at its neck; testes dissected out; substance of left herniated through a hole in the tunica albuginea, which was freely notched; testes stitched in pockets in the usual way; part of the thickened skin of the penis also removed. Wound healed kindly in 34 days. The fistula remained patent. Tumour weighed 8 ozs.

Sloughing.
Hydrocele.

cii. Hindu male, æt. 40. Case of elephantiasis of scrotum only. Slough on the fundus of it; hydrocele on left side; recent venereal sore and bubo. General health bad. The diseased parts were removed by an elliptical incision at the root of the scrotum. The penis was not decorticated; hydrocele emptied and redundant tunica removed; right tunica adherent. Pockets made for testes and side flaps drawn over them in the usual manner. Operation succeeded by strong fever, which did not subside.

Penis swelled and became gangrenous; wound got sloughy. CHAP. X.
 An unhealthy abscess formed in the abdominal wall. Type VI. B. 1. b.
 of fever became low. Died of septic blood poisoning in Gangrene.
 eleven days. Tumour weighed 10 ozs. Death.

SERIES (c). COMPLICATED WITH URINARY FISTULA.

Cases, 3 ; Deaths, 0.

ciii. Hindu, æt. 27. Duration, eight years. Had stricture of the urethra and urinary fistula. Body not well nourished; spleen slightly enlarged; weight, 1 lb. 1 oz. Had ischio-rectal abscess, which was opened. Absconded after 64 days, almost cured. Urinary fistula.

civ. Hindu, æt. 30. About five years' duration. General health indifferent. There was urinary fistula in the penis; weight 1 lb. 10 ozs. Slight hydrocele of the right tunica. A drainage tube passed into the urethra. Prepuce of cartilaginous hardness. A few warty growths around the meatus. Recovered; the fistula contracted. Discharged after 48 days. There was a history of syphilis. Hydrocele.

cv. A Madrassee, æt. 32 years. Duration, two years. History of syphilis. Weight, 2 lbs. Had a urinary fistula in penis. A tube was passed into the urethra. General health good. Recovered after 61 days. Urinary fistula.

SERIES (d). COMPLICATED WITH VARICOCELE.

Cases, 2 ; Deaths, 2.

cvi. Hindu, æt. 58. Fifteen or sixteen years' duration; general health indifferent; arcus senilis. Right testicle removed; cord slipped; free venous hæmorrhage; inguinal canal slit up; bleeding point secured with difficulty; died in 22 hours, of exhaustion; no new bleeding. Large varicocele on right side; granular kidneys. Varicocele.

cvi. Hindu, æt. 30. Syphilis sixteen years ago; tumour of five years' duration. History of periodical fever and swelling; latter reduced by free exudation from surface of tumour on subsidence of fever. Weakly man, subject to dysentery. Operation as in case lvii. Varicose veins on right side tied with catgut. Wound remained sweet for a Syphilis.
Varicocele.
Death.

CHAP. X. week. Tetanus set in in nine days, and carried the patient
VI. B. I. 6. off in three days. Weight of tumour, 10 ozs.

SERIES (e). COMPLICATED WITH LARGE HYDROCELE OR
HÆMATOCELE.

Cases, 14; Deaths, 6.

Hæmatocele. cviii. Hindu, æt. 40. Four years' duration. General health
bad. Suppurative hæmatocele on right side: laid open, and
Tetanus. tunica, testicle, and scrotum removed a few days afterwards.
Death. Weighed 2 lbs. Died in nine days of tetanus. (Dr. Palmer.)
Hæmatocele. cix. Hindu, æt. 34. Six years' duration. Health good.
Removed bloodlessly in the usual manner; 11 lbs. 14 ozs.
Large hæmatocele on left side. Recovered. Discharged in
54 days. (Dr. Palmer.)

Hydrocele. cx. Hindu male, æt. 30. Three years' duration. Enor-
mous hydrocele on right side and very large on left;
phimosis of penis, which was otherwise unaffected. Hyper-
trophied fundus of the scrotum removed by elliptical in-
cision; hydroceles emptied; redundant tunica clipped off;
testes stitched as in case xlv.; phimosis slit. Operation
performed antiseptically. Wound remained aseptic, and
healed in 24 days. Patient discharged in 35 days. Tumour
weighed 1 lb. 10 ozs.

Hæmatocele. cx. Hindu male, æt. 30. Ten years' duration; hæmatocele
on right and hydrocele on left side; skin of penis sound, not
removed; thickened portion of scrotum taken away by
elliptical incision. Tunica emptied and pared off; testes
stitched as usual; lateral flaps brought over them. Opera-
tion performed antiseptically. Wound remained sweet, and
Tetanus. repair was in satisfactory progress when tetanus set in on
Death. thirteenth day, and carried him off on twenty-first after
operation. (See *Indian Medical Gazette*, vol. xvi., 1881,
page 202.)

Hæmatocele. cxii. Native Christian male, æt. 40. Four years' duration.
Hæmatocele on right side and hydrocele on left. Operation
as in case cxi. Wound remained aseptic and healed in
56 days. Tumour weighed 17 ozs.

Hydrocele. cxiii. Mahomedan male, æt. 27. Five years' duration.
Immense hydrocele on left side, a small one on right.
Operation as in case cx. Wound putrefied and became

sloughy. Surrounding tissues œdematous and excoriated. CHAP. X.
Suffered from pyrexia. Tetanus set in on ninth day, and VI. B. I. 6.
carried him off on twelfth day after operation. Tumour Death.
weighed 12 ozs.

cxiv. Hindu male, æt. 40. Two years' duration. Hæma- Hæmatocele.
tocele on right side and hydrocele on left. Operation as in
case cxi. Wound putrefied, and some sloughing took place
from the surface of the cords. On the separation of the
sloughs healthy repair set in, and was completed in 61 days.
Tumour weighed 14 ozs.

cxv. Mahomedan male, æt. 40. Three years' duration. Hydrocele.
Immense hydrocele on right side, a small one on left.
Health indifferent. Operation as in case cx. Right
tunica contained a large quantity of jelly-like lymph
material. As much of the redundant tunica as possible
removed by scissors. Flaps brought over testes to within
three-quarters of an inch. Wound remained aseptic and
healed without suppuration. Discharged in 30 days. The
mass which was removed weighed 1 lb 4 ozs.

cxvi. Hindu male, æt. 40. Three years' duration. Large Abdominal
hydrocele on right side, extending upwards along the cord, hydrocele.
and entering the abdomen through the ring. Skin of penis
and scrotum removed in the usual way. Unobliterated
processus of right side dissected off the cord, and sides of
dilated ring of this side brought together by strong catgut
thread; testes stitched in pockets, and skin flaps brought
over them. Right testicle became gangrenous, and was Castration.
removed two days after operation; wound putrefied and
septic suppuration ascended through ring into the right
iliac fossa. Counter-opening and drainage resorted to;
discharge profuse and fœtid. Diarrhœa and pneumonia
set in, and patient died of exhaustion 42 days after opera- Death.
tion. Tumour weighed $8\frac{1}{2}$ ozs.

cxvii. Hindu, æt. 41. Eight years' duration. History Hydrocele of
of hydrocele and fever. Operation as in case lvii. Six cord and
pints of fluid in left tunica, which was continuous with an tunica.
unobliterated processus vaginalis; 10 ozs. in right tunica.
Wound remained aseptic and healed kindly. Penis had to
be isolated on two or three occasions. Discharged in
73 days. Weight of mass 18 lbs. 2 ozs.

cxviii. Hindu, æt. 42. Eight years' duration. History

CHAP. X.

VI. B. I. b.
Hydrocele.

Tetanus.

Death.

Hæmatocele.

Hydrocele
and hæmato-
cele.

Tetanus.

Recovery.

Hæmatocele
and hydrocele.Incision of
hæmatocele.Removal of
scrotum.

of hydrocele and periodical fever. Operation as in case lvii. Double hydrocele of very large size. Wound remained sweet. Symptoms of carbolic poisoning noticed a week after operation; dressings changed to boracic. Symptoms of tetanus appeared nine days after operation, which proved fatal in two days. Tumour weighed 32 lbs. cxix. Hindu male, æt. 55. Tumour, involving both penis and scrotum, of ten months' duration. History of gonorrhœa and mercury and occasional fever. Usual operation. Large hæmatocele on right side. The cord of this side swelled greatly after operation. This subsided very gradually by absorption. Recovered in 72 days. Tumour weighed 4 lbs.

cxx. Eurasian male, æt. 28. Hypertrophy of penis and scrotum of twelve years' duration, commenced after an attack of dengue fever. Suffered from fever at irregular intervals. Hydrocele of right side, tapped ten days before admission. An abscess formed on the right side of the scrotum, which was laid open. Penis decorticated, and scrotum removed in the usual way. Hæmatocele of right side; slight attack of reactive fever. Wound remained sweet and was healing satisfactorily when he got an attack of tetanus 47 days after operation. This developed into a severe and critical illness, from which he recovered. Discharged well in 89 days. Tumour weighed 1 lb. 2 ozs.

cxxi. Hindu male, æt. 30. Admitted with purul hæmatocele of left side, hydrocele on right, and severe inflammatory swelling of scrotum. Suffered from high fever of remittent type and was very low. Hæmatocele freely laid open and emptied. Much oozing from divided tunica, which was enormously thickened. This was stopped by passing a continuous catgut suture through the membrane about half an inch from the edge. Counter-openings had to be made to liberate pus which formed in the cellular tissue of the scrotum. The lining membrane of the sac came away as an entire bladder-like sac. The wound eventually granulated and filled up, the fever subsided, and his constitutional state greatly improved. One month after the first operation, a second was performed for the purpose of removing the hypertrophied scrotum. This was accomplished by elliptical incisions as in case xiii. The right tunica was laid open and emptied of the clear fluid

which it contained. The redundant portion of it was excised. The remains of the thickened left tunica were also pared off. The testes were then stitched in perineal pockets as usual. A considerable amount of blood was lost. The operation was followed by high fever, which did not subside. The wound became sloughy and the neighbouring skin gangrenous. The gangrene spread, patient became low and delirious, and died of prostration six days after the last operation. The tumour weighed $13\frac{1}{2}$ ozs.

CHAP. X.
VI. B. I. b.

SERIES (f). COMPLICATED WITH HERNIA.

Cases, 8; deaths, 4.

exxii. Hindu, æt. 40. Eight years' duration. History of syphilis. Oblique reducible inguinal hernia on right side. Operation as in case xxxiii. Wood's operation performed after removal of tumour; wire removed in ten days. Large hydrocele on left side. Wound granulated and cicatrised slowly. Hernia recurred. Discharged in 89 days with a truss. Weighed 1 lb. 15 ozs.

Wood's operation.

Recurrence of hernia.

exxiii. Mahomedan male, æt. 30. Twelve years' duration. Right oblique inguinal hernia of five years' duration; double hydrocele; spleen much enlarged, liver slightly so; in the habit of consuming 12 grs. of opium daily. Tumour removed antiseptically and bloodlessly. Flaps taken from thigh. Sac of hernia dissected out, ligatured at neck, and cut off; stump reduced into canal, pillars and sides of canal brought together by iron wire. Suffered from strong reaction; symptoms of septicæmia appeared on sixth day. Wound putrid and sloughy. The unhealthy action extended, bedsores formed, and patient sank of exhaustion twelve days after operation. No symptom of peritonitis. (Vide *Indian Medical Gazette*, vol. xvi., 1881, p. 113, and plate II.)

Double operation.

Septicæmia.

Death.

exxiv. Hindu male, æt. 45. Seven years' duration. Right oblique inguinal hernia (scrotal) of five years' duration. Scrotal tumour removed as usual. Sac of hernia dissected out. Spermatic artery accidentally wounded, castration of right testicle performed in consequence. Pillars and sides of canal brought together with two double catgut threads; some suppuration took place around the stump of

Double operation.

Castration.

CHAP. X.
VI. B. I. b.
Recovery. the cord, requiring the use of a drainage tube, otherwise the wound pursued the usual aseptic course; and patient left hospital 67 days after the operation, with a sound cicatrix. The right inguinal canal was blocked up, the ring obliterated, and there was no impulse nor tendency to hernial descent. The tumour weighed 6 lbs. 4 ozs. (See *Indian Medical Gazette*, vol. vii., 1882, p. 50.)

Hernia. cxxv. Mahomedan, æt. 45. Had irreducible right inguinal hernia on admission; had been down for five hours; was reduced in four hours after application of ice. Large Hydrocele. hydrocele on right side, smaller on left. Scrotum thickened (elephantoid). Ablation of scrotum performed four days after. Skin of penis unaffected and not removed. Hydroceles emptied and redundant tunicae removed. Sac of hernia dissected out, ligatured at neck, and cut off. Pillars and sides of inguinal canal brought together by strong catgut ligature. Pockets made for testes in the usual way; testes stitched together, and skin drawn over them by continuous suture. Castration. The right testis and cord exhibited signs of strangulation, and were removed next day. The wound putrefied and suppurated. Burrowing of matter took place along the track of both cords, requiring free counter-opening and drainage. Considerable constitutional disturbance at this time. Result eventually satisfactory. No sign of return of hernia, and scrotal wound healed up firmly. Discharged in 42 days. Tumour weighed 13 ozs. (See *Indian Medical Gazette*, vol. xvii., 1882, p. 164.)

Recovery.
Hernia. cxxvi. Hindu, æt. 38. Two years' duration. History of hydrocele and inflamed scrotum. Left reducible inguinal hernia. Operation as in case cxxv. Wound putrefied, skin Double operation. flaps sloughed, and suppuration ran up the left cord. Pyæmia. Sloughs separated, and wound was granulating when suppurative parotitis supervened, with fever of typhoid type. Death. Patient sank 24 days after operation.

Hernia. cxxvii. Hindu male, æt. 60. Tumour, involving penis and scrotum, of twelve years' duration. History of periodic fever and hydrocele. Subject to right inguinal hernia. Usual operation performed. Oblique incision made over right cord. Sac of hernia dissected out and removed after tying the neck; pillars brought together by catgut. Fever with rigor set in on the evening of the day of operation and Double operation.

continued to increase daily. Sloughing cellulitis attacked the wound and spread into the right abdominal wall, requiring free incision. Prostration ensued, and he died of septicaemia seven days after operation. No sign of peritonitis on post-mortem examination. Wound gangrenous; the gangrene had extended along both cords. Large fibrinous clots in right cavities, smaller in left. Tumour weighed 3 lbs. 6 ozs.

CHAP. X.

VI. B. I. b.

Cellulitis.

Septicaemia.

Death.

ccxviii. Hindu male, æt. 33. Scrotal tumour of three years', and right oblique inguinal hernia of four years' duration. The hernia got strangulated three years ago, and an operation was performed by Dr. Partridge for its radical cure (probably Wood's). It descended a month after he left hospital. A truss does not prevent descent. History of periodical fever. Scrotum removed by elliptical incisions meeting at the root of the penis and perineum, and sac dissected out; cord spread out over its posterior surface. After ligaturing the neck of the sac and amputating its body, the loop slipped, and several coils of small intestines protruded. These were returned, the edges of the peritoneal opening were caught by artery forceps, and the neck of the sac thus secured was transfixed, and securely ligatured a second time. The pillars were brought together with catgut. The right testis was now examined with care, and as the cord was very long and scattered, and no pulsation was felt in the spermatic artery, castration was resorted to. The remaining testis was then stitched as usual in the pocket which had been prepared for it. The whole proceeding was conducted under strict antiseptic precautions. Patient was very restless after the operation, and the abdomen became tympanitic; this subsided on the third day after a purgative. The wound remained sweet, and was undergoing satisfactory repair, when, on the seventh day of operation, tetanus set in and proved fatal in eighteen hours. The tumour weighed 6 lbs. 14 ozs. A post-mortem examination was not permitted.

Hernia.

Wood's operation.

Recurrence.

Double operation.

Castration.

Tetanus.

Death.

ccxix. Hindu male, æt. 38. Sustained an injury of the scrotum in boyhood, and since then has had an oblique hernia of the right side and considerable enlargement of the testes and their coverings. Has suffered much from fever off and on. One and a half years ago the right scrotum

Hernia.

CHAP. X.

VI. B. 1. c.
Hæmatocele.
Double
operation.

burst, and has been discharging dark offensive matter ever since. Scrotum removed in the usual way; penis not decorticated. Hæmatocele on right side laid open, tunica pared and scraped down. Incision made over right cord; sac dissected out, tied, and amputated. Suffered from strong fever for a week. Wound became sloughy; the sloughs separated and healthy granulations formed. Absconded in 55 days with the wound quite superficial and nearly healed; no descent of hernia. Tumour weighed 2 lbs. 4 ozs. The case is detailed at greater length in the *Indian Medical Gazette* for December 1883.

Recovery.

Spleen.

c. Elephantiasis of the Labia.—i. Hindu female, æt. 24. One year's duration. Very delicate; enlarged spleen. Tumour removed almost bloodlessly. Wounds were cicatrizing when she got an attack of erysipelas succeeded by peritonitis. Died in 21 days.

Erysipelas.

Death.

Syphilis.

ii. Hindu female, æt. 30, prostitute. Commenced a year ago; history of syphilis. Labia majora and minora much hypertrophied. Polypoid masses springing from front and back wall of vagina; urethra pushed back and enormously dilated. (Had evidently copulated through urethra.) All the masses removed. Was making a good recovery when she got a severe attack of erysipelas; was recovering from this when a relapse took place. Died of meningitis 49 days after the operation.

Erysipelas.

Death.

Bubo.

Spleen.

iii. Hindu female, æt. 30. Twelve years' duration. History of ulcers on labia and suppurating buboes; salivated thrice. General health indifferent; spleen enlarged. Both labia enormously hypertrophied, forming large pendulous tumours. A third existed between them corresponding to the position of the clitoris. All these removed simultaneously. Bleeding prevented by preliminary ligature of pedicle with whipcord. Dressed with boracic ointment spread on gauze: catheter retained. Healed slowly by granulation. Result satisfactory. Discharged 96 days after operation. Weighed 7 lbs. 10 ozs.

Syphilis.

iv. Hindu female, æt. 30. Two years' duration following syphilis, for which she was salivated. Preputium clitoridis formed a large pendulous mass about the size of an orange. Both labia majora and minora hypertrophied. All the hypertrophied tissue was removed, the clitoris being left

behind, and the wound dressed with boracic ointment, and a catheter retained permanently in the bladder. Repair took place in 59 days. The parts removed weighed 8 ozs.

CHAP. X.

VI. B. I. C.

v. Mahomedan, æt. 30. One year's duration. History of syphilis. All the external parts involved; stricture of rectum and recto-vaginal fistula; condylomatous masses in the vestibule. Disease removed partly by knife and partly by écraseur: tumour weighed 15½ ozs. The wound became putrid, and unhealthy action set in. Symptoms of carbolic poisoning were observed, and the dressing promptly exchanged for boracic. Patient died of pneumonia seven days after operation. Death.

vi. Hindu, æt. 26. Three years' duration. Of syphilitic origin; involved all the external organs. Removed by incision after the base of the tumour had been tightly ligatured with whipcord passed through it by means of a hernia needle; mass weighed 3 lbs. 4 ozs. Wound healed by granulation in 140 days.

vii. Hindu, æt. 24. Four years' duration. History of suppurating buboes. Both labia majora affected. Tumours excised after the base of them had been tied tightly with whipcord to prevent loss of blood. Weighed 6 lbs. 4 ozs. Wound healed by granulation in 106 days.

viii. Mahomedan female, æt. 28. Tumour, implicating both labia majora, of two years' duration. History of venereal sores and suppurating bubo. Base of tumour transfixed by a needle and tied tightly with stout silk; mass dissected off. Slight reactive fever. Wound healed by granulation in 40 days. Tumour weighed 3 lbs. 4½ ozs.

Venereal sores and bubo.

ix. Hindu female, æt. 24. Hypertrophy of both labia minora, of four years' duration, following venereal sores. Base of nymphae secured by Smith's clamp; tumours removed and stump cauterized with a red-hot iron. Recovered in nineteen days.

Venereal sores.

Comment.—It is not in accordance with the plan and object of this work to enter into lengthened discussions regarding the pathology of the various diseases and diseased conditions which have been treated by surgical operation. A large mass of very interesting information on the subject of elephantiasis

CHAP. X.

Drs. Fox and
Farquhar's
report.

Geography of
Elephantiasis.

Most common
sites.

Ligature of
femoral for
elephantiasis
of leg.

Other parts
rarely affected.

will be found in a valuable report "On Certain Endemic Skin and other Diseases of India and Hot Climates generally," compiled by Drs. Tilbury Fox and T. Farquhar, and published in 1876 under the sanction of the Secretary of State for India in Council. There are certain points, however, illustrated by the present series of cases to which I shall briefly allude.

1. The number of the cases is remarkable—140 in all, or nearly 18 per cent. of the whole. The disease is confined to the littoral districts of India, and very few cases of elephantiasis are met with in the central and northern parts of Hindustan. This fact is borne out by the figures recorded in Appendix A.

2. Although the cases almost exclusively concern elephantiasis of the genital organs, it is not the case that these are the most frequent site of the disease. On the contrary, statistics collected by Day, Waring, Richards, Moodeen Sheriff, and others, render it certain that the lower extremities, one or both, are by far more frequently affected than other parts of the body. Elephantiasis of the extremities does not, however, incapacitate for labour, and no efficient cure short of amputation has as yet been devised for this form. Elephantiasis of the genital organs, on the other hand, in most cases causes sexual incapacity, and is remediable by operation. Hence the great excess of applicants for relief for this variety of the disease. I have not attempted to cure elephantiasis of the extremities by operation. Ligature of the femoral artery was resorted to by Fayrer, following Carnochan of New York and Butcher of Dublin, but the results were not encouraging. The bulk of the affected limb can be greatly reduced by recumbency and elastic bandages, by the occasional application of a blister, and the use of iodine or iodide of lead ointment.

3. The scrotal affection is very rarely associated with elephantiasis elsewhere. This point is noticed by Waring, Fayrer, and Richards. In only four out of

the 140 cases of the present series did the disease affect other parts. CHAP. X.

4. The disease appears to affect the genital organs of men much more frequently than of women. The paucity of cases of labial elephantiasis may perhaps be due in part to a disinclination to resort to hospital for a disease of this kind, and to the more restricted accommodation for females afforded in the hospital; but it is proved by statistics that elephantiasis is less common among women than men, and that elephantiasis of the genital organs is proportionately less frequent among females than males. Female genitals less subject to elephantiasis than male.

5. Although the great majority of cases suffer from fever of a periodic type, the spleen is not found to be enlarged in many of these cases. Enlargement was only detected in 7 out of the 140. This was probably due to true malarious fever, and the proportion is probably not larger than among natives of Bengal generally. Without entering into reasons, it appears certain that the fever of elephantiasis is distinct in cause and type from ague and its congeners. A moderate degree of splenic enlargement, if not of recent origin or associated with existing fever, is not found to be a bar to the performance of the operation of removal of scrotal elephantiasis. Enlargement of spleen not common.

6. Of the two forms of scrotal elephantiasis which have been differentiated—namely, the ordinary more or less solid tumour and the “lymph scrotum”—the former is by far the most common. Only 4 cases of lymph scrotum were met with among the 129 scrotal tumours above recorded. In 14 other cases dilated lymphatics were observed, but the main mass of the tumour was solid. In true lymph scrotum the tissue is soft, compressible, and spongy. It is only the latter case that appears to be associated with filariæ. Lymph scrotum. Filariæ. I have repeatedly searched for them in the common variety, and have never succeeded in discovering them either in the blood or in fluids drawn from the

K

CHAP. X.

Relations between syphilis and elephantiasis.

tumour. The relation of filariæ to elephantiasis has still to be worked out thoroughly.

7. Syphilis is frequently mentioned in these cases. This term includes all the varieties of venereal sore. A history of syphilis was elicited in 20 out of these 140 cases. Dr. Allan Webb, a distinguished member of the Indian medical service, used to distinguish a syphilitic as distinguished from the common variety of elephantiasis. Large growths of a condylomatous and warty nature are often seen on the genitals of both males and females in India, and this I suspect is what Dr. Webb described as syphilitic elephantiasis. The part which syphilis plays in the production of these scrotal growths is twofold. Local irritation of any kind often initiates them, and the irritation of a chancre or chancroid is no doubt often the starting-point of a scrotal elephantiasis. A more efficient factor is, I suspect, the irritation of the inguinal glands which venereal sores excite. The lymphatics are prominently if not principally implicated in this morbid process, and a hyperplasia or inflammation or suppurative breaking-down of the lymphatic glands in the groin must lead to obstruction and perhaps inflammation of the lymph channels beyond, and this appears to be an early and essential feature in all cases of elephantiasis.

Frequency of disease of tunica vaginalis in elephantiasis.

8. The frequency with which disease of the tunica vaginalis is associated with scrotal elephantiasis is very remarkable. Hydrocele or hæmatocele was noted in 79 of these 140 cases, and in many instances the disease of the tunica preceded the appearance of the elephantiasis, while in many it constituted a very formidable complication. Considering the intimate relation which exists between serous membranes and cavities and the lymphatic system, it is not surprising if this process is a chronic lymphangitis, that implication of the tunica vaginalis should constitute an early and prominent symptom of the malady.

9. It will be observed that an attempt was made in these cases to conduct the operation in accordance with antiseptic principles and methods. Looking to the great size of the wound, the proximity of the urethral and anal orifices, and the flexures of the thighs, the difficulty of maintaining these wounds in an aseptic state must obviously be very great, and it is not to be wondered at that frequently failures resulted. Better results were attained as experience grew, and plastic methods were resorted to, to reduce the size of the wound and accelerate the covering in of the testes. The operation which was finally adopted is described in the following extract from a clinical lecture which I delivered on the subject, in which the various steps are detailed at length, and the process of repair is fully described.

CHAP. X

Antiseptics in removal of scrotal tumours.

"In the first place, accumulated experience in this hospital has established the necessity of removing every particle of the hypertrophied tissue, more particularly when situated on the perineal aspect of the tumour or on the penis: for it has been found that if any part of the elephantoid skin be left behind, it forms a nucleus for the reproduction of the tumour. This rule, curiously, does not apply to the pubis. I have left thickened skin behind in this region, and found that during recovery it has assumed a normal character. But while every scrap of the disease should be taken away, it is not necessary to remove tissues or organs which have not become diseased, and it has been everywhere recognised as an essential element of the operation to save the organs of generation, which are very rarely so diseased as to require removal.

Removal of all diseased tissue necessary.

Organs of generation not removed.

"It has also been established as a condition of success in this operation that as little blood should be lost as possible. These tumours sometimes contain a very considerable quantity of blood, and the vessels supplying and traversing them are large; and if precautions be not taken to empty the tumour of its blood

Precautions against loss of blood.

CHAP. X.

beforehand, and restrain the flow of blood during and after the operation, the shock of the operation will be intensified and the chances of recovery very much reduced.

"In the earlier operations both in England and in this country the hæmorrhage was terrible. Patients died on the operating table, or shortly after removal into the ward; or surgeons sought by rapidity of operating to minimise loss, and in very large tumours swept off the whole mass without searching for or trying to preserve either penis or testes, and tied the arteries as fast as they could. Thanks to Esmarch, we are now enabled to proceed more deliberately, and the bugbear of hæmorrhage need no longer unnerve our hand or obscure our judgment.

Important to ascertain condition of parts.

"It is very necessary, before proceeding to operate to ascertain accurately the condition of the parts, because the operation will be performed much more intelligently if we have previously obtained an exact knowledge of the structures to be divided and exposed.

Limits of the tumour should be defined.

"No difficulty is experienced in finding out the extent of the tumour—how far it has involved the skin and how far it has extended before and behind: inspection and palpation suffice for this purpose. We should settle in our minds, before commencing, the lines of incision, and determine how much skin we are to remove with the hypertrophied mass. I have seen Professor Cutcliffe mark out the line of incision by a series of silk stitches. This, however, I do not consider necessary. As a rule you will be able to leave a considerable amount of skin at the sides of the tumour—skin which has been dragged off the surface of the thigh, and which is felt by pinching it between the finger and thumb to be healthy. The disease advances further towards the raphe and perinæum than in any other direction; hence it is advisable to cut freely on that aspect of the mass. I have recently seen in the *Glasgow Medical Journal* an account by Dr. G. A. Turner of 138 cases of amputation of the scrotum

for elephantiasis Arabum, and noticed that the first step of the operation practised by him was to cut a semilunar flap from the perineal aspect of the tumour; other flaps being subsequently taken from the pubic and lateral aspects. Such a procedure here would inevitably be followed by a reproduction of the tumour; for we have found that when reproduction has taken place, it has invariably proceeded from a too scanty taking away of the skin at the back and sides of the tumour.

CHAP. X.

Perineal flaps
not desirable.

"As regards the penis, it is easy enough to ascertain its state when it has undergone hypertrophy without retraction, but when the organ has been retracted into the mass of the tumour it is difficult to determine its position, &c., without introducing the finger into the elongated preputial canal. By doing this you are able to find out accurately the condition of the glans penis and of the mucous membrane of the preputial cavity. You are also able to obtain important information as regards the condition of the cord and testes, more especially by bimanual examination, which will enable you to roll, between the finger inside and the hand outside, the cord, and ascertain whether there be a hernia or hydrocele present. You will also be able by this means to fix the position of the testes, and by eliciting the sensation of fluctuation discover the presence of fluid in the tunica vaginalis.

Examination
through the
preputial
canal.

"It is very important to make certain whether a hernia exists or not; for it has happened repeatedly that the discovery has been made during the performance of the operation; and the intestine has been wounded, or its return found impossible from adhesions. Patients generally know when they have a rupture, but it sometimes happens that a hernia has descended into a large tumour through a dilated ring without the patient's knowledge. I do not consider the existence of hernia an absolute bar to operation, but it is necessary to know that it is there, to avoid the risk of

Importance of
discovering
hernia.

CHAP. X.

which I have spoken, and in order deliberately to adopt measures suited to the circumstances.

"I shall now presume that you have thoroughly examined the tumour, that the patient is healthy, and that there is no reason why the tumour should not be removed, and proceed to describe the operation in detail.

Emptying the
tumour of
blood.

"The first step is to empty the tumour of blood. This was done formerly by raising the tumour and allowing it to drain by gravity; this was assisted by the application of ice. This system was very imperfect, and it kept the patient on the table for an hour or so before the operation, in a state of expectancy and alarm; we are now able by the use of indiarubber bandages to anæmiate the tumour in ten minutes. The application of the bandage should be commenced at the fundus; and the tumour should be gradually encircled by loops and rings from the fundus to the neck. If the tumour be very large, some surgeons say that it is not safe to throw the whole of the blood which it contains into the circulation, but I have found no evil effects from emptying very large tumours, weighing 30, 40, 50, up to 96 lbs., as thoroughly as possible. Having emptied the tumour of its blood, the next step is to apply something to the neck of it to keep it empty and prevent bleeding during and after operation. A clamp or a loop of cord, passing through a ring, used to be employed for this purpose (*vide* Fayrer's "Clinical Surgery in India," p. 348), and I observe that in Samoa an iron clamp, whose bars are brought together by a pair of strong screws, is still in use. Professor Partridge, following Esmarch, introduced a system of belts, elastic cords, and tapes. You are familiar with this arrangement, which was first published in the *Indian Medical Gazette* in January 1875. It is perfectly efficient when carefully adjusted. It is somewhat troublesome to apply, however. The abdominal belt tends to impede respiration, the elastic cord encircling the neck of the tumour is

Prevention of
hæmorrhage
during operation.

Clamps.

Belt and
elastic cord.

apt to obscure the dissection, and any sudden or violent motion of the patient tends to cause the skin edges to slip from its grasp, and free bleeding may thus arise. In the last two or three operations I have dispensed with this belt, and by using an indiarubber cord only, I have been able to compress the neck most efficiently. This has been done by placing the middle of the cord over the lumbar region: this gives two ends. I take the right end and pass it round the left side of the neck of the tumour, crossing the pubis. Having encircled the neck on the left side, the loop crosses in front of the anus to the right, lodges in the cleft of the nates, and is brought round a second time over the crest of the ilium, and again carried around the neck of the tumour, and above the crest of the ilium; the same manœuvre is carried out on the opposite side with the other end of the cord, and the two ends are finally looped over the abdomen.

The mode of
applying the
elastic cord.

"The neck of the tumour is thus clasped by four tight cords of indiarubber, crossing each other over the pubes and in front of the anus; it is compressed by an elastic oval loop, which presses vertically as well as laterally, and has therefore less tendency to slip than a single ring or loop. The main pressure of the stretched cord is brought to bear on the crests of the iliac bones, and there is no pressure on the abdomen except that which results from the final loop.

"The diagrams which I exhibit indicate clearly the manner of applying the cord. (Figs. 1 and 2.)

"A second cord may be applied in the same way if the tumour is very large. The efficiency of the arrangement was severely tested by the 30-lbs. tumour which I removed about a fortnight ago, and it is much simpler and easier of application than the old plan of belt, loops, and tapes.

"These preliminaries having been settled, we next proceed to operate. The first thing we have to do is to expose and isolate the genital organs; this is done

CHAP. X.

Isolation of
the penis.

by making three vertical cuts in front—one central for the removal of the penis, and one on each side of this for the exhumation of the testes. (Fig. 1, *a b*.)

“The incision for exposing the penis is made, if the organ is embedded, with the assistance of a long and strong director, which is passed into the preputial canal, its point being made prominent near the pubes. Take care to place the director in the preputial canal and not in the urethra, or else, as happened once in this theatre, the penis may be bisected. If you take the precaution of feeling the point of the director under the pubic

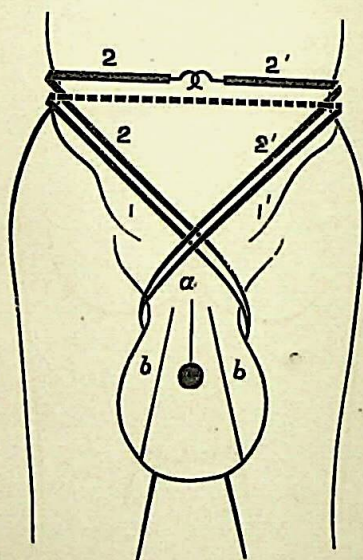


FIG. 1.

skin, and take the additional precaution of introducing your finger into the preputial canal and satisfying yourself that the glans penis lies below the instrument, you cannot commit a mistake.

“Use a strong knife to slit the canal, perforating its roof and cutting out, and if this incision does not suffice, supplement it with additional incisions from without. The penis is provided with a very loose areolar covering, which separates the skin from the fibrous capsule of the organ. This is necessary in order

to admit of the free locomotion which the skin undergoes. It is not advisable to remove this tissue, in which a number of blood-vessels ramify, and the disease, as a matter of fact, never implicates it.

"Having reached the loose areolar tunic of the penis, it is very easy to separate or peel off the hypertrophied skin; this is done by means of the finger and a few light touches of the scalpel.

"I advise you to remove the whole of the preputial skin and mucous membrane close up to the corona glan-
dis, however healthy it may appear to be; if not, as I

The whole prepuce should be removed.

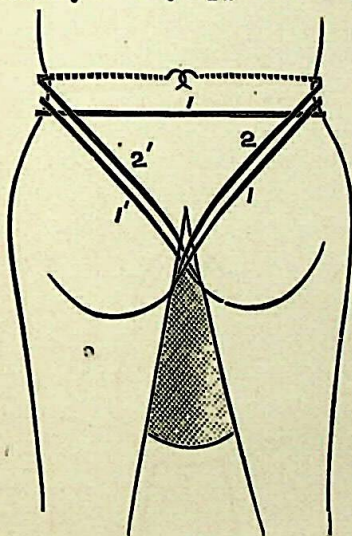


FIG. 2.

have repeatedly observed, what you leave behind becomes first cedematous and then elephantoid. This is easily accomplished by a circular sweep in the sulcus, the glans being depressed by the thumb and the preputial mucous membrane put on the stretch by an assistant. If any adhesions, ulcers, or other complications exist, the circular sweep may be made wide of the glans, and the finer trimming left for a later stage. The penis having been thoroughly decorticated, it is raised out of the tumour and held over the pubis.

CHAP. X.

Exposure of
the testes.

"We will suppose that you have some idea of the position of the testes. If you find a depressed cicatrix on the fundus of the tumour, you may anticipate that the testis is adherent to the cortex of the tumour. This may result from abscess, moxa, or issue. Cut boldly through the cortex of the tumour over the position of the cord and testes, from the neck to the fundus. The only risk to be met with now is the risk of cutting into a large hydrocele, and thereby deluging yourself or your assistants. No other harm is done. If you have previously identified a hydrocele, or find one in process of dissection, don't open it until after you have dissected it out. It is easier to dig it out whole, and it can then be punctured and its contents allowed to escape into a convenient vessel.

Enucleation of
the testes.

"The testes and cord generally lie in a gelatinous mass, which is cedematous areolar tissue. An assistant separates the divided cortex, and a few longitudinal incisions in this gelatinous material generally expose these organs; sometimes the testes are situated far back, and we experience a difficulty in finding them, more especially if there is no hydrocele or hæmatocele; under these circumstances, it is best to cut down on the cord and follow it down to the testis. If adhesions exist between the testis and cortex of the tumour, they should be divided by the knife, the incision being made wide of the organ. The testicle and cord can then be easily stripped up to the superficial inguinal ring; and as they are removed they are held over the pubes by an assistant. First one (generally the left) and then the other is thus dealt with. It is not necessary to strip off any of their proper tunics. The dissection exposes the intercolumnar fascia which is retained.

"Having in this manner dug out the penis and testes—and this can be done with great rapidity—the mass of the tumour may now be removed; the organs of generation are held out of the way, and the three vertical incisions connected by transverse cuts.

"These transverse cuts are made just beyond the pubic limit of the tumour and the exact and proper line of incision is generally indicated by where the dense fatless structure of the tumour ends and the abundant fat of the mons veneris commences. This is seen in the central section. If no such line of demarcation is visible, the division should be made over the lower border of the body of the os pubis. The penis and cords may at this stage be still further isolated, and nothing left for the final sweep but the lateral and posterior attachments of the mass covering its perineal pedicle. The entire mass is finally removed by drawing it forcibly to one side and then to the other, and making a bold circular sweep in the healthy skin beyond the limit of the elephantiasis from where the transverse cuts previously described end to the raphe behind. It is advisable by a few touches of the knife to peel the tumour off the perineal cellular tissue, as by this means the vessels are left longer and the bleeding thereby better controlled. The tumour is finally removed by a last sweep from above downwards.

Amputation
of the mass.

"Having done this, no time should be lost in looking for the bleeding vessels. If the cord is acting efficiently there will be little or no bleeding, and all visible orifices should be secured before it is loosened. The largest vessels are found in three positions:—*First*, issuing from the perineal stump beneath the root of the penis. These are the enlarged superficial perineal branches of the internal pudic, and enter the tumour from within; and in big tumours they may be as large as the radial or tibial. They are the most important vessels. *Second*, at each corner of the anterior part of the wound and along its lateral margins, the trunk and branches of the inferior external pudic are found. *Third*, between the penis and the pubic margin of the wound the terminal branches of the internal pudic are seen, and there are sometimes one or two large vessels on the dorsum of the penis, also terminal branches. Vessels

Search for
arteries.

CHAP. X.

of considerable size are sometimes found coursing alongside the cords. Another artery of importance is the artery of the frenum, which sometimes gives trouble by bleeding.

"Having secured as many of the vessels as you can see, you may gradually relax the cord by unwinding it. You will probably find some arteries spring: the hæmorrhage from them is not great, however, and if several jets start, pressure by sponge, finger, or forceps, suffices to prevent any material loss. Every bleeding point should be carefully secured. I have found carbolized catgut perfectly efficient for this purpose; sometimes 30 or 40 ligatures are required, and the loops are never seen again; they undergo absorption. The vessels having been secured, the next step consists in trimming the testes. At this stage of the operation you may remove any hypertrophied skin or tissue that may have been left behind, more particularly on the perineal aspect. Even if the testes are normal and the tunicæ healthy, I am in the habit, following Professor Partridge's practice, of laying the tunica open, and removing its anterior wall, thus preventing any subsequent accumulation in it, and providing a means of stitching the testes together in the manner which I shall presently explain.

Trimming the testes.

Management of hydrocele.

"If hydrocele exists, the fluid should be evacuated and the tunica pared off close to the testicles. When the tunicæ have undergone fibroid or cartilaginous or calcareous degeneration, you will find that the testes have got flattened out behind this degenerated mass, and that the body of the epididymis has been separated from the testes by a distinct sulcus, and the elements of the cord have been flattened out. Under these circumstances some surgeons have removed everything by castration, but I believe that it very rarely happens that the testes themselves are so diseased as to warrant their removal; all that really requires removal being the redundant material by which they are surrounded. You will recol-

lect that the testes lie in the scrotum in an oblique position, having a free and an attached edge, the free edge anterior and inferior, and the attached edge posterior and superior. In the normal state of matters the tunica vaginalis entirely envelopes the testes, except superiorly and posteriorly, where it is reflected off the surface of the organ. The tunica is on the outer aspect reflected off the testis on to the epididymis, and there is a pouch or depression thus caused. When the tunica is much thickened, this pouch is widened and deepened,

Anatomy of
healthy and
diseased
tunica.

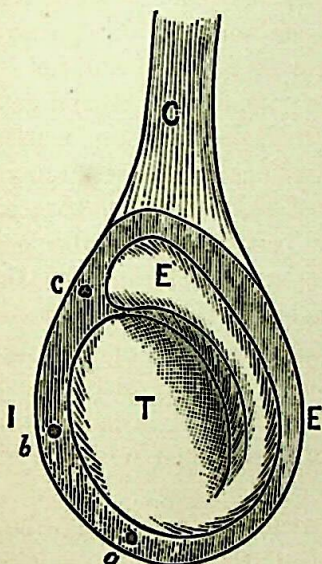


FIG. 3.

so that the testis is separated from the epididymis by a considerable distance; you will also find the elements of the cord flattened out superiorly, but this flattening actually takes place in the other tunics, and the tunica proper can be removed without disturbing the cord. In trimming the testes under these circumstances be careful to cut the tunica only, or else you may divide the cord or some of its elements. If you identify the tunica, which you can easily do in the cut which has laid it

CHAP. X.

open, you may peel it off very close to the testis as far as the internal and inferior aspect of the organ is concerned, and take the redundant material away if there be no blood-vessels ramifying on it; leave, however, a slip of tunica and fascia for the attachment of the cremaster and for the purpose of carrying the stitches. (Fig. 3, *a b c*.)

"You must be more careful in trimming the superior and posterior border on which lies the epididymis, in order not to injure that body or the vas.

"If you only remove tunica, you need be in no fear of endangering the nutrition of the testis, and however abundant and voluminous the fasciæ of the cord may be, they ultimately undergo infiltration and absorption.

"The rule in operating is to remove diseased tunica freely, fascia sparingly, and leave a sufficient border of both to hold the stitches.

Management
of hæmato-
cele.

"If hæmatocele exists, which is by no means uncommon, it is dealt with in the same way—the contents of the tunica being cleared out, and the tunica itself pared and trimmed. However ugly the parts may look in these cases, castration is seldom if ever necessary, and the ultimate result is satisfactory.

Isolation of
the penis.

"Now turn your attention to the root of the penis. The penis has a great tendency to retraction in the subsequent process of granulation; you should therefore isolate it well to start with. Detach it carefully from all its surroundings, with the exception of the suspensory ligament, which should be exposed but not divided. There now remains only the stitching of the testes in position and covering them in with skin. Formerly they were simply applied to the surface of the perinæum and allowed to contract adhesions and obtain a covering as best they might in the huge mass of lymph and blood which was effused around them. Flaps have been cut from the tumour, thigh, and pubes, to cover the testes. I am in the habit of making pockets for their reception, and I have found

Flaps.

them to be more efficient and convenient than covering them with flaps. I used formerly to cut flaps from the thigh; in some cases they retained their vitality, and united to each other and to the surface of the testes, while in other cases they underwent suppuration and sloughing.

"On the whole I have found the system of digging pockets to be better than that of transplanting flaps. This is done by finding the deep layer of the superficial perineal fascia, and following this to the arch of the pubes. In Dr. Chiene's "Lectures on Surgical Anatomy" he tells us (page 90) that if we cut through the skin and subcutaneous fascia over the position of the cord down to its surface, and introduce a finger and work it into the scrotum, we find a pocket. If by endeavouring to push the finger in different directions we study the attachments of this pocket, we find that the finger is prevented from travelling externally by the attachment to the arch of the pubes and fascia lata, and to the opposite side, by the septum in the middle, and backwards by the attachment to the lower border of the triangular ligament.

"If you can deepen this pocket you simply restore the cavity in which the testis formerly lay, and you are not likely to encounter any large vessels in doing so, because the fascia lies between two systems of vessels, the superficial and deep.

"By following this fascia you can construct your pockets by means of the finger and handle of the scalpel. After completing them there remains a mass of areolar tissue in the centre and a thick flap outside of each pocket, ready to form a lid for it. The more skin you have been able to leave at the sides, the more efficiently can you cover the testes afterwards. Having fashioned your pockets, you next fasten the testes in position by a continuous catgut suture; you hold the free edge of the testes with their collar of tunica internal (Fig. 3); you then pass a needle through the

Mode of
digging
pockets.

Covering in
the testes.

CHAP. X.
 Stitching the
 testes.

System of
 dressing.

Mode of
 repair.

remains of the tunica vaginalis, which has been left for this purpose, through the central cellular mass in the perinaeum and through the collar of the opposite testis; place three stitches in this way, and tie the ends. Now place the testes in the pockets, where they will assume an easy and natural position, and drag the fascia and skin over their anterior aspect by a continuous suture, commencing from the posterior angle of the wound; do not bring the edges of the skin quite into apposition, for a large amount of material will be effused into the pockets, which might cause tension and lead to suppuration, and a means of escape must be provided. The suture should be carried to the root of the penis. The cords in some cases are very voluminous, and may form prominent swellings almost embedding the penis; these masses disappear in time by retraction and absorption. The operation should be conducted under strict antiseptic precautions, and the parts may now be finally washed with a 1 in 20 carbolic lotion. The wound is dressed antiseptically with boracic gauze and boracic lint, and layers of carbolic gauze covered with oiled paper outside of all. Adjust the bandages so as to compress every edge of the dressings in order to prevent putrefaction. The discharge is profuse and the risk of contamination great. A daily change of dressing is therefore necessary for the first week or ten days. Thereafter the dressings may be changed every second or third day. The results of the operation thus performed are, as you have had abundant opportunities of observing—

"*First*, that the testes, which have been placed in a natural and favourable position, readily become embedded in the pockets which have been made for them.

"*Second*, the redundant material exuded by the extensive wound escapes into the dressings, and does not form a large tumour whose absorption is slow.

"*Third*, the flaps or lids adhere to the surface of the

testes, and cover them in, and in most cases without suppuration.

"In three or four weeks an excellent new scrotum is formed. The delay in recovery from the operation is caused by the slow manner in which the penis is covered with cicatricial skin. The organ is kept carefully isolated, and it is an organ which undergoes changes in position and bulk. These causes militate against rapid cicatrization. From the glans and root a ring of epidermic growth gradually advances. After a lapse of three or four weeks more, these meet about half-way, and then the cure is complete; the patient has been relieved of a great burden and deformity, and has been restored to the exercise of what he is apt to consider one of the most important and agreeable functions of life."

The operation for extirpating labial tumours consists simply in thoroughly removing the morbid mass. In very large tumours of this kind I have been in the habit of piercing and ligating their base with strong whipcord, for the purpose of preventing hæmorrhage. Probably the use of Spencer Wells' forceps would more conveniently serve the same purpose. My colleague, Dr. D. O'C. Raye, is in the habit of bringing the edges of the wound left by the removal of these tumours together by stitches, and thus materially shortening the period of repair. Boracic dressings were used in these cases. Probably the use of iodoform in these as well as in scrotal operations, would aid in maintaining the aseptic state.

Removal of
labial elephan-
tiasis.

10. In discussing the mortality following operations for elephantiasis, I shall deal only with the 129 scrotal cases. Among these 129, 23 deaths took place, or 17.7 per cent. Fayrer's mortality was 35 deaths in 193 cases, or 18.2 per cent. The difference is not very great, and this is all the more remarkable in view of the substantial improvement which has been proved to have taken place in the mortality following

Mortality
following
removal of
scrotal
tumours.

146 MORTALITY OF SCROTAL OPERATIONS.

CHAP. X.

amputations. I have arranged these cases in several categories as follows :—

Mortality greater in complicated cases.

Class.	Number.	Deaths.	Percentage.
Uncomplicated cases	92	8	8.7
Complicated with ulceration and sloughing	10	3	30
Complicated with urinary fistula	3	0	...
Complicated with varicocele	2	2	100
Complicated with large hydrocele or hæmatocele	14	6	42.8
Complicated with hernia	8	4	50
Total ...	129	23	17.7

Sixty-five per cent. of the deaths took place among the complicated cases, which constitute but 28 per cent. of the whole number. I have been unable for want of sufficient detail to distribute Fayrer's cases into similar classes, but from a perusal of them I gather that the proportion of those presenting serious complications was smaller than in the present series. A comparison of the causes of mortality is interesting.

Causes of death.

CAUSES.	FAYRER'S CASES.		AUTHOR'S CASES.	
	Number.	Percentage.	Number.	Percentage.
Shock	2	5.7	...	...
Tetanus	6	17.2	9	39.1
Gangrene	1	2.8	1	4.4
Septic diseases—erysipelas, septicæmia, &c... ..	15	42.8	6	26.1
Exhaustion	7	20	4	17.4
Other causes	4	11.5	3	13
Total ...	35	...	23	...

These figures indicate a reduction of septic disease, shock and exhaustion as causes of death, and bear testimony to the great frequency with which tetanus follows operations involving interference with the testes.

CHAPTER XI.

NON-MALIGNANT TUMOURS.

Cases, 65 ; Deaths, 11.

VI. B. 2. **Inflammatory Tumour of Mamma.**—Obstinate Mahomedan sweeper, æt. 22. Disease of six years' duration. Resulted from an abscess. A sinus remained which obstinately resisted all efforts to close it. The axillary glands of the right side were enormously enlarged, one of them had suppurated and burst, and given rise to a sinus in the axilla. Mamma indurated and hypertrophied. As the patient's health was suffering from the prolonged discharge and continued irritation, it was thought best to remove the whole mass. This was done antiseptically. A spiral wire drainage tube was found in the interior of the axillary sinus. The axillary glands were found to be undergoing caseation. The operation was a severe one ; patient lost a good deal of blood. She suffered from severe shock, from which she did not rally, and died 30 hours after the operation. Obstinate sinuses and enlargement of mamma and axillary glands.
Removal.
Death by shock.

3. a. **Condyloma of Anus.**—A Hindu female, æt. 25. The tubercles were noticed a month ago. There was a history of true syphilis and leucorrhœa. There were also two fissures. The growths were excised by a pair of scissors under chloroform, and the sphincter divided for the fissures. Discharged cured after 36 days. Removal of anal condylomata by scissors.

ii. Hindu male, æt. 8. History of hereditary syphilis ; removed by scissors. Discharged well in 25 days.

b. **Condyloma of Labium.**—Hindu female, æt. 27. Ten months' duration. Right labium majus ; both labia minora and part of clitoris removed by knife. Healed slowly by granulation ; result satisfactory. Left hospital in 64 days after operation. Labial condyloma excised.

4. **Molluscum of Face.**—Mahomedan male, æt. 27.

CHAP. XI.

VI. B. 5.

Excision of molluscum.

Eight years' duration. A pendulous cutaneous outgrowth, springing from the left lower eyelid, removed by elliptical incision; a V-shaped piece of skin dissected off the cheek to support the lid. Healing took place under careful management without eversion of lid. One month in hospital.

Excision of half of lower jaw.

5. *a. Fibroma of Lower Jaw.*—i. Hindu male, æt. 20. Two and a half years' duration. Left ramus and almost whole of body involved. Removed without difficulty; two incisions made through middle of lower lip and angle of mouth. Body divided opposite right first bicuspid; subperiosteal disarticulation of left ramus. Satisfactory recovery. Discharged in 42 days.

Ditto.

ii. Hindu male, æt. 30. Tumour of left side of ten years' duration. Removed insufficiently seven years ago. The portion left behind gradually increased to the size of a large orange. Skin much thinned and ulcerated in two places. Mass exposed by two semi-lunar incisions, including thinned and ulcerated skin. Tumour removed by disarticulation of lower jaw. Wound healed above and below by first intention; gaped in the centre; filled up by granulations. Aperture gradually contracted. A second operation needed to obliterate it. Left hospital 75 days after operation.

Suspicious growth on face.

b. Fibroma of Face.—Hindu male, æt. 40. Had a small lump in front of his right ear from boyhood; began to increase rapidly after an attack of fever a year ago. Skin adherent and ulcerated in two or three spots, base moveable. General health good. Removed by incision. Part of the parotid gland, which looked suspicious, also removed. Operation followed by facial paralysis. Wound healed by granulation in 74 days.

Ulcerated fibrous tumour of breast.

c. Fibroma of Mamma.—Hindu female, æt. 20. Pendulous tumour of right breast; extensive sloughing of skin had taken place on anterior aspect. No disease of axillary glands. Removed by elliptical incision. Wound healed by granulation. Discharged with sound cicatrix in 55 days. Tumour found to be a fibroma.

Fibrous tumour of male breast.

d. Fibroma of Male Mammilla.—European male, æt. 41. Hard mass about the size of a walnut, of three months' growth. Gland removed along with nipple and areola. Catgut drain inserted and edges brought together;

healed by first intention in thirteen days. The tumour on examination was found to be a simple mass of fibrous tissue.

CHAP. XI.

VI. B. 6. 7.

e. **Fibroma of Back.**—Hindu male, æt. 45. Twenty-five years' duration. Size of a cocoanut, situated over lumbar spine. Rapid growth within three years; acutely painful latterly. Removed antiseptically by single incision; deep attachments ligatured by catgut before division. Healed by first intention without suppuration; no secondary fever. Discharged in 27 days. (See Case VI. A. 3. e., iii. p. 106.)

Recurrent
tumour of
back.

f. **Fibroma of Thigh.**—Ten years' duration. Situated over the left Scarpa's triangle; freely moveable. Removed by elliptical incision under antiseptic precautions. Wound healed by granulation in 47 days.

Tumour over
Scarpa's
triangle.

6. **Fibro-Cartilaginous Tumour of Cheek.**—Mahomedan, æt. 32. Twelve years' duration. Removed by single incision. Recovered. Discharged in 60 days. (Dr. Palmer.)

Fibro-
chondroma.

7. **Fibro-Cystoma of Axilla.**—Hindu male, æt. 23. Had a boil in the right axilla eight months ago, which burst and left an ulcer, which was neglected and healed slowly. It was succeeded by a swelling in the same region, which has grown very rapidly during the last two months. Tumour circumscribed and moveable. Extends from outer border of scapula to one and a half inch above right nipple. Soft, elastic, doughy, and painful on pressing; exposed by single incision parallel to lower border of pectoralis major. Did not possess a capsule. Merged into surrounding areolar tissue; intimately connected with veins of axilla. Extirpated by scissors and scalpel; wound closed antiseptically. Suffered from shock for twelve hours. Had feeble reaction with considerable prostration. Diarrhœa and vomiting set in, and he sank; exhausted, three days after operation. The tumour was examined by Professor McConnell, whose description of it is as follows:—

Cystic axillary
tumour.

Removal.

"A multilocular cyst, which does not appear to be connected with any large blood-vessels; its walls are composed of fibro-elastic tissues, and lined by flat pavement epithelium. The loculi vary in size from that of a sparrow's egg to that of a walnut. They contain glutinous-looking fluid, which under the microscope exhibits mucoid material

Description of
growth.

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VI. B. 9.

with small round mucous corpuscles, epithelium, and a few blood-cells. In parts walls are thick and semi-solid. When incised presents a honey-combed or cavernous structure from commencing disruption and differentiation into cystic expansions."

Fatty tumour
of cheek.

a. Lipoma of Cheek.—Hindu male, æt. 35. Left side. Removed. Recovered. Discharged in 44 days, could not close left eye: left with salivary fistula. (Dr. Palmer.)

Large fatty
tumour of
thigh.

b. Lipoma of Thigh.—Hindu male, æt. 12. Six years' duration. Upper part of left thigh anteriorly; weighed 6 lbs. Removed by single incision antiseptically; was doing well when tetanus supervened on 11th day; died 18 days after operation.

Death.

Cartilaginous
outgrowth of
nose.

g. a. Enchondroma of Nose.—Hindu male, æt. 32. Eight months' duration. Size of a large potato. Excised by straight incision, found to spring from cartilage of septum, which was divided; wound gaped at lower part, and secondary operation became necessary. Left hospital in 43 days with a somewhat flattened nose.

Extirpation of
sub-maxillary
gland.

b. Cartilaginous Tumour of Left Sub-Maxillary Gland.—Hindu male, æt. 40. Swelling noticed three months ago. Sub-maxillary gland removed, its deep attachments being tied before division with catgut. Dissection deep and difficult. Wound healed by first intention. Left hospital in 29 days.

Deep tumour in
sub-maxillary
triangle.

c. Cartilaginous Tumour of Neck.—i. Hindu male, æt. 38. One year's duration. Situated on right side of neck deeply between parotid and sub-maxillary glands, bulging into fauces; about the size of an orange. Exposed by incision in sub-maxillary triangle, and shelled out with the finger. Operation performed antiseptically and drainage tube inserted. Wound healed in eight days. Left hospital in eleven days. (See *Indian Medical Gazette*, vol. xvii., 1882, p. 73.)

Cartilaginous
growth in sub-
maxillary
region.

ii. Hindu male, æt. 20. Eight years' duration. Below left side of lower jaw; size of an orange; freely moveable. Exposed by horizontal incision below border of jaw, and removed with a piece of the lower jaw to which it adhered; sub-maxillary gland left. Wound suppurated, but healed by granulation. Left hospital in 22 days with a linear cicatrix.

iii. Hindu male, æt. 36. Ten years' duration. An enormous tumour, weighing 14 lbs. after removal, hanging from the right side of the neck. Removed by elliptical incision. Vessels, which were very large and numerous, as far as possible tied before division. Sub-maxillary gland and a few lymphatic glands also removed. Wound left open and dressed with boracic ointment. Suffered from shock, which passed off, and was succeeded by mild reaction. Wound was undergoing satisfactory repair by granulation until the tenth day, when secondary hæmorrhage took place from the facial artery, which had been divided close to its origin. This vessel was secured by ligature, but the bleeding recurred on the eleventh day and carried him off. (See *Indian Medical Gazette*, vol. xvi., 1881, p. 250.)

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Large tumour of neck.

Secondary hæmorrhage.

(See Death.

10. Osteoma of Lower Jaw.—Hindu male, æt. 40. Growth of eleven years' duration. Involved left half of lower jaw; as large as a fist; jaw divided at symphysis and across upper part of ramus. Sub-maxillary gland, which was infiltrated, also removed. Skin divided over lower margin of jaw; lower lip left intact. Wound inflamed. Septic fever and secondary hæmorrhage occurred in third week. Suppurative periostitis of right half of lower jaw; parotitis and pleurisy supervened, and death took place from septicæmia 21 days after the operation.

Removal of half of lower jaw.

Death by septicæmia.

11. Exostosis of Femur.—Hindu male, æt. 25. Growth situated on inner side of lower end of left femur; of fifteen years' duration; originally started by a blow from a hammer; about the size of a large orange, and pedunculated. Removed antiseptically by chisel and hammer. An abscess formed beneath the extensor muscles, which had to be opened. Both wound and abscess remained aseptic. Discharged well in 41 days.

Exostosis of lower end of femur.

12. Osteo-Cystoma of Lower Jaw.—i. Hindu female, æt. 25. Tumour of right side of lower jaw, of two years' duration. Jaw divided at symphysis and below coronoid process; mucous membrane stitched with catgut, and edges of skin wound brought together by iron wire and horse-hair stitches. Drained by caoutchouc tube. Wound healed by first intention; very slight constitutional disturbance. Left hospital 20 days after operation.

Removal of half of lower jaw.

ii. Hindu male, æt. 32. Tumour of two years' duration;

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Removal of
half of lower
jaw.

as large as a foetal head ; situated on left side. Jaw removed from symphysis to coronoid process ; mucous membrane stitched with catgut ; drainage tube introduced. Healed partly by first intention ; wound inflamed, and diffuse cellulitis occurred in its neighbourhood. Patient became insane, and remained so for about a week. Left hospital in good health, mental and bodily, in 42 days, with the wound soundly repaired.

Lymphatic
tumours of
neck.

13. *a. Lymphadenoma of Neck.*—Hindu male, *æt.* 36. Large multiple lymphatic tumours on right side of neck, observed nine months ago ; recent increase rapid ; causing much pain by pressure, and considerable difficulty in breathing and swallowing. Straight incision made in front of the sterno-mastoid and thirteen glandular masses enucleated. Stopped breathing in the course of the operation. Breathing re-established by artificial respiration, and operation completed. Did not recover consciousness, became asphyxiated, and had spasm of the glottis. Tracheotomy, performed after forcible traction of the tongue by forceps, &c., failed to relieve the obstruction. Artificial respiration diligently carried out by direct method without avail. On post-mortem examination heart found dilated and fatty. All the signs of death by asphyxia present. No injury of pneumogastric or other important structure. Lungs congested. No blood in air-tubes. (See *Indian Medical Gazette*, vol. xviii., 1883, p. 199.)

Death by
chloroform
asphyxia.

Removal of
large axillary
glands.

b. Lymphadenoma of Axilla.—i. Negro sailor, *æt.* 28. Abscess on left side of chest two years ago ; burst ; necrosis of the fifth rib detected ; sequestrum removed. Axillary glands began to enlarge six months ago, attained very large dimensions. All the glands in the axillary space removed antiseptically. Recovered. Discharged from hospital in 63 days after operation.

Ditto.

ii. Hindu female, *æt.* 50. Of 24 years' growth. Increase rapid during last two years ; lanced by a barber, wound became unhealthy and sloughy ; admitted with a large excavation in floor of left axilla, full of putrid pus and maggots, and surrounded by indurated tissue moveable on chest wall. Mass dissected out. Axillary artery and vein implicated in indurated mass. They were divided and secured by proximal and distal catgut ligatures ; wound left

Axillary artery
and vein
ligatured.

to heal by granulation. The chasm gradually filled up in 106 days, and contracted. Vitality of extremity not impaired. No pulse at the wrist. Little or no constitutional disturbance throughout. Boracic dressing used.

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VI. B. 14.

c. **Glandular Tumour of Male Mammilla.**—Hindu male, æt. 22. About the size of an orange; of five years' duration; knotty to feel; circumscribed. Removed antiseptically; wound healed kindly. Left hospital in 27 days. Tumour of male breast.

14. a. **Vascular Tumour of Right Eyebrow.**—Hindu, æt. 16. Right eyebrow; ten years' duration. Excised. Recovered. Discharged in ten days. (Dr. Palmer.) Cavernous angioma.

b. **Angioma of Ear.**—Hindu male, æt. 24. Right pinna enormously swollen; began to swell five years ago. Part livid, hot, pulsating. A curved needle was passed beneath the posterior auricular and the branches of the temporal and occipital arteries, supplying the ear, and double catgut threads tied tightly over rolls of boracic gauze. The pulsation stopped at once, the pinna got gradually smaller, cooler, and firmer. The ligatures came away in about a fortnight, the part of the threads in contact with the tissues having been almost or entirely absorbed. Small linear ulcers remained, which soon healed. Left the hospital eighteen days after the operation, greatly relieved. Angioma treated by mediate ligation.

c. **Angioma (Venous) of Abdominal Wall.**—Mahomedan male, æt. 35. Admitted with a small tumour over the xyphoid cartilage, of five years' duration, bleeding profusely through a small orifice—dilated veins coursing up to it from below; burst six days ago. It was laid open, and a cavity was found, out of which venous blood gushed freely. Pressure below it restrained the flow, and a strong catgut thread was passed deeply through the abdominal wall on this aspect of the tumour, and tied over a roll of boracic gauze. This caused the welling to cease. A graduated compress of lint soaked in tinct. fer. perchlorid. was placed on the tumour. He had a severe attack of fever the same day. Abdomen became tympanitic; right lung pneumonic. Symptoms of typhoid prostration ensued and he died 51 hours after operation. No post-mortem examination was allowed. Venous angioma.

d. **Vascular Tumour of Thigh.**—East Indian, æt. 13. Congenital, size of a nut. Involved skin and fascia lata; Cavernous angioma.

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VI. B. 15-17.

Cavernous
tumour of
arm.

partially excised; fundus ligatured; done antiseptically. Recovered. Discharged from hospital with sound cicatrix, and without a trace of the tumour, in thirty days.

15. **Lymphangioma of Arm.**—English child, 13 months old. A soft swelling of six months' growth on the inside of right arm, above the elbow, implicated skin and subcutaneous areolar tissue. Removed by elliptical incision. Tumour cavernous, cells filled with clear fluid. Wound healed by first intention in ten days.

Large wen.

16. *a.* **Sebaceous Cyst of Scalp.**—i. Hindu male, æt. 19. Congenital, situated over anterior fontanel; size of an orange. Opened antiseptically; emptied. Lining wall scraped and drainage tube inserted. Collapsed and healed. Discharged in 32 days with some induration remaining in site of tumour.

Dermoid cyst
of eyelid;

ii. Hindu male, æt. 30. Congenital large dermoid cyst situated above upper left eyelid. Exposed by straight incision parallel to the eyebrow, and removed whole; found adherent to periosteum; healed by granulation. Remained 22 days in hospital.

of cheek;

b. **Dermoid Cyst of Cheek.**—Eurasian male, æt. 20. growth of three years' duration; size of pigeon's egg. Encleated antiseptically; catgut drain used. Healed by first intention. Discharged in eleven days.

of forehead.

c. **Cystic Tumour of Forehead.**—Hindoo male, æt. 25. Congenital dermoid cyst above right eyebrow; size of a small apple. Removed antiseptically by single incision. Healed by first intention. Discharged in 22 days.

Cyst of neck;

d. **Cystic Tumour of Neck.**—Hindu male, æt. 16. Situated between hyoid bone and thyroid cartilage below skin; two years' growth. Removed antiseptically. Recovered in fourteen days. Linear cicatrix.

of back;

e. **Cyst of Back.**—Sebaceous cyst behind left shoulder; of two years' growth; about the size of a mango. Removed antiseptically. Wound healed almost entirely by first intention. Discharged in nineteen days.

of foot.

f. **Cyst of Foot.**—Situated in front of left ankle; of five years' duration. Removed antiseptically by single incision. Remained sweet, and healed in 28 days.

17. **Venous Hæmatoma of Axilla.**—Hindu male, æt. 45. Tumour noticed two months ago; grew very rapidly.

Left axilla filled with a large, globular, very tense tumour, from which venous blood flowed on puncture. Removed antiseptically. Loop of catgut threads passed round axillary vessels before operation; deep connections secured with catgut ligature before division. Found to be an immense outgrowth or aneurism of the axillary vein. Wound healed mostly by first intention. Left hospital with sound cicatrix in 38 days. (Vide *Indian Medical Gazette*, vol. xv., 1880, p. 305; and *Lancet*, vol. i. of 1881, p. 133.)

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VI. B. 18-20.

Axillary
 hæmatoma.Successful
removal.

18. **Bronchocele.**—Mahomedan male, æt. 29. Eight years' duration, about the size of a child's head. Removed antiseptically; straight incision in middle line of neck; base of tumour ligatured with catgut in several sections before division. Wound healed mostly by first intention. Lower part suppurated and healed by granulation. Left hospital in 62 days with a linear cicatrix. Further details are given in the *Indian Medical Gazette*, vol. xv., 1880, p. 250.

Removal of
large broncho-
cele.

19. **a. Papilloma of Penis and Scrotum.**—Mahomedan male, æt. 28. Had a venereal sore on the penis about a year ago. Warts began to grow on the prepuce about four months back, and they gradually extended over the penis and scrotum, which were now thickly covered with vascular warty masses. Skin of scrotum considerably thickened. Glans concealed by a large bunchy mass of preputial papillomata. Operation performed as for scrotal tumour. Parts covered with sound cicatrix in 58 days.

Warty tumour
of penis and
scrotum.

b. **Papilloma of Right Leg.**—Hindu male, æt. 55. A warty growth of two years' duration, implicating the skin of the lower aspect of right leg, lower third. It was removed antiseptically, and a number of fragments of skin were grafted by means of a catgut thread on the exposed fascia. He had a severe attack of fever, with rigor, on the second day, followed by pneumonia of right lung, which ended fatally five days after the operation. The great majority of the grafts were found to have retained their vitality and become embedded in lymph.

Warty tumour
of leg.Death by
pneumonia.

20. **a. Mucous Polypus of Mouth.**—Hindu male, æt. 16. Admitted with his mouth full of a mass of polypoid material of four months' growth, which was found to spring from the hard palate; mouth permanently open. Respiration and deglutition greatly impeded. A wire écraseur was

Large polypus
of mouth.

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VI. B. 21.

Rectal
polypus.Excision of
piles by clamp,
scissors, and
cautery.

passed over the fundus of the tumour, and the narrow pedicle easily severed. Relief was immediate. A subsequent tendency to grow was checked by the application of lunar caustic. Left the hospital in 43 days.

b. Polypus (Rectum).—An East Indian boy, *æt.* 3½. History of bleeding from the rectum for almost a year. On examination polypoid growths were detected about an inch above the anus. Put under chloroform; one as large as an almond was brought down with polypus forceps, seized with a clamp, and cauterized. Another gave way as it was being brought down. Not much bleeding. Discharged after seventeen days, cured.

21. Piles (Internal and External).—i. A Mahomedan male, *æt.* 29 years. History of piles for three months, and ulceration of the rectum after dysentery. There was also a fissure-like condition. Put under chloroform; about four piles excised (internal and external). The internal ones clamped, excised, and cauterized. The sphincter ani divided for fissure. Absconded after a fortnight.

ii. A Hindu male, *æt.* 40. History of piles for about eighteen years. There were masses of piles both internal and external. Was very anæmic on account of loss of blood from them. Under chloroform they were clamped, excised, and then cauterized. The sphincter was divided to prevent subsequent contraction. The bleeding stopped; general health improved. Discharged after 50 days with slight contraction of the anus.

iii. Hindu female, *æt.* 25. External piles and fissure; former cut off and latter divided. Discharged well in eighteen days.

iv. Hindu male, *æt.* 40. Internal bleeding piles; clamped, cut off by scissors, and cauterized. Recovered in twenty days.

v. Armenian male, *æt.* 24. External piles and fissure; former cut off and latter divided. Left hospital, well, in 28 days.

vi. Eurasian male, *æt.* 22. Internal bleeding piles; clamped, cut off by scissors, and cauterized. Cured in eleven days.

vii. Hindu male, *æt.* 23. Internal bleeding piles, very anæmic; venous murmur in neck. Clamped, removed by

scissors, and cauterized. Discharged in 30 days with wounds healed and general health greatly improved.

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VI. B. 21.

viii. English male, æt. 38. Internal and external piles; former bled. Clamped, removed by scissors, and cauterized. Left hospital in nineteen days.

ix. Mahomedan male, æt. 50. Internal piles of three years' duration; bleeding and prolapsus. Very anæmic and feeble. Removed by clamp, scissors, and cautery; very little blood lost. Patient had constant involuntary loose motions, and died of exhaustion in three days. Fatal case.

x. Hindu male, æt. 55. External piles of six years' duration. Bled after stool. In a sloughy condition. Removed radially by clamp, scissors, and cautery; morphia suppository inserted. Discharged in twenty days with a sound anus; no contraction or incontinence.

xi. Mahomedan female, æt. 55. External piles of six months' duration, associated with fissure. Piles removed with scissors, and fissure divided. Discharged in 32 days, quite cured.

xii. English male, æt. 39. External piles of nine years' duration, encircling anus and bleeding after stool. Retention of urine. Removed in sections radially by clamp, scissors, and cautery; suppository inserted. Operation followed by retention. Slight bleeding on fourth day. Discharged in 26 days after a satisfactory recovery.

Case ix. died of exhaustion, due mainly to the disease. In the other three cases (x., xi., and xii.), though the tumours were situated outside the anal opening, the hæmorrhoidal swelling extended in ridges into the gut, and the clamp was made to embrace these prolongations.

xiii. Hindu male, æt. 30. One large pile, partly external and partly internal, removed by clamp, scissors, and cautery. Healed satisfactorily in ten days.

xiv. European male, æt. 38. Anus surrounded by large piles, which protruded and bled at stool, and had to be replaced mechanically. Ten years' duration. Removed in sections by scissors, clamp, and cautery. Satisfactory result in 39 days.

xv. European male, æt. 49. Five internal piles; re-Ligature.

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moved by scissors after ligature of their base with catgut. Good result in 34 days.

xvi. Jew, æt. 30. Internal piles of uncertain duration; painful defæcation and prolapsus; no bleeding. Three tumours removed by clamp and cautery. Recovered in nine days.

xvii. Hindu male, æt. 55. Internal piles of five years' standing; bled occasionally. Removed by clamp and cautery. Good result in eleven days.

Fistula and
piles.

xviii. Hindu male, æt. 40. Complete fistula of eight months' and external piles of two years' duration. Fistula divided and piles removed by scissors. Recovered and left hospital in twelve days.

Preliminary
deligation.

Comment.—These notes give examples of almost every variety of simple tumour. The natives of India are very subject to morbid growths of all sorts, but if they do not occasion much suffering, disfiguration, or incapacity, they seldom resort to hospitals for their removal. When they do come, the tumours have often acquired a very large size. In the removal of tumours of great bulk or vascularity, or situated in dangerous positions, I have found preliminary deligations of the arteries with catgut a safe and useful measure.

Remarkable
cases.

The most noteworthy of these tumours are:—Case 2, in which a metal drainage tube had been left by mistake in a mammary sinus, leading to great inflammatory hypertrophy of the organs and of the adjacent axillary glands; case 7, *fibro-cystoma of the axilla*, a rare and curious growth; case 9. c. iii., *cartilaginous tumour of the neck*, which had attained an immense size; case 11, *an exostosis of the lower end of the femur*, removed successfully with antiseptic precautions; case 13. b. ii., *glandular tumour of axilla*, in which both axillary artery and vein were accidentally divided without interfering with the vitality of the limb; case 13, *venous hæmatoma of axilla*, an interesting example of a somewhat rare disease successfully treated

by extirpation; case 14, a successful removal of a large *bronchocle*.⁶ CHAP. XI.

I once witnessed an interesting incident which compares instructively with the experience furnished by case 13. *b. ii.* I was assisting Brigade-Surgeon Cayley in removing a cancerous growth in the right groin—recurrent after a previous amputation of the penis. The femoral vein gave way, and had to be ligatured above and below the spot where the disease had implicated its wall. In isolating the vein, a large branch of the femoral artery was divided so close to the main trunk that a ligature had to be placed above and below it. The operation was desisted from, and the limb swathed in flannel. The extremity retained its vitality, and the patient eventually died, some weeks afterwards, of the cancer. Probably in both cases the circulation through the main vessels had been impeded, and the collateral branches had undergone compensatory enlargement.

Femoral
artery and vein
tied without
gangrene
ensuing.

It is a matter of history that John Hunter, in his earlier operations for popliteal aneurism, tied both artery and vein without gangrene of the limb resulting. In the case to which I allude the deligation took place at the level of Poupart's ligament, above the origin of the profunda and the place of entry of the internal saphenous vein.

CHAPTER XII.

REMOVAL OF FOREIGN BODIES.

Cases, 7 ; Deaths, 0.

I. FROM THE NASAL CAVITY.

VII. 1. i. ii. Both cases were children, and the foreign bodies were easily removed by means of the scoop end of a director.

Large piece of
sola in nostril.

iii. Hindu male, *æt.* 5. Had introduced a piece of *sola* or pith into the right nostril five months ago. Inflammation and swelling ensued, the nostril was plugged, and there was a constant discharge of pus and blood from it. The mass had swelled and become firmly impacted. It was removed partly by a director sweeping the cavity from above downwards, and partly by forceps. Some epistaxis ensued, but not of sufficient consequence to necessitate plugging. The boy left hospital in a few days.

2. FROM THE PHARYNX.

Fish-bone in
the glottis.

i. ii. In one of these cases the foreign body was the vertebra of a fish, the tranverse processes of which had pierced the aryteno-epiglottidean folds on each side. It was caught with forceps by the spinous process, and removed.

3. FROM THE ŒSOPHAGUS.

Mass of guava
in the gullet.

Hindu male child, *æt.* 2 years. Two days before admission attempted to swallow a guava fruit which he had partially masticated. It stuck in his gullet. He had vomited fragments of it, but was unable to swallow. Water taken into the œsophagus was immediately rejected. A whalebone sponge probang, well oiled, was passed, and the foreign body dislodged, and pushed into the stomach. He was now able to swallow and retain food and water. Left hospital next day apparently quite well.

4. FROM THE URETHRA.

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VII. 4.

Hindu male, æt. 32. Had suffered from chancre sixteen years ago. The ulcer was behind the corona glandis inferiorly, and left a cartilaginous induration, which caused great contraction of the urethra in this position. He subsequently contracted gonorrhœa, which was followed by gleet and stricture in the membranous part of the urethra. On the day preceding his admission he had retention, for which a medical practitioner tried to pass a No. 4 catheter. It was forced through the anterior structure with great difficulty, and a false passage was made into the erectile substance of the penis immediately behind the stricture. Failing to reach the bladder, the operator tried to withdraw the instrument, and in doing so, broke it at the junction of the shaft and curve.

Silver catheter forced into the penis and broken.

The latter remained behind, and could be felt on handling the penis. The stricture was divided by urethrotomy and the fragment removed by forceps; the posterior stricture was subsequently dilated by bougies; slight bleeding persisted for 24 hours and then ceased. Urine was passed in good stream, and the patient insisted on leaving hospital in three days.

Removal after internal urethrotomy.

Comment.—These cases represent but a fraction of the applicants for relief on account of lodgment of foreign bodies in the ear and nose. Cases of this kind seldom require subsequent detention in hospital. Seeds of plants are the foreign bodies most commonly found, and the *ruttee*, the seed of the *Abrus precatorius*, is a special favourite with children. Pins and fish-bones occasionally get beyond reach, and if they stick in the pharynx, the aid of the surgeon is sought. The only case of special interest in this series is No. 4, which bears witness to the recklessness and violence with which instruments are pushed into the urethra, and too often through it, by unskilful and bold practitioners. This matter will be again referred to under the head of perineal section.

Reckless use of catheters.

M

CHAPTER XIII.

REMOVAL OF CALCULI.

Cases, 30; Deaths, 4.

VIII. 1. 2. 3.

1. URETHRAL, BY FORCEPS.

Impacted
urethral cal-
culus.

Hindu male, æt. 36. Suffered from difficulty in making water for eight days. Stone detected in urethra, impacted about 5 inches from the orifice; removed by long forceps. Patient left hospital the same day.

2. URETHRAL, BY INCISION.

Fatal case.

i. Symptoms of two days' duration. Two calculi extracted after incision into urethra. Catheter retained; cystitis. Removed by friends after a month, in a sinking state. (Dr. Palmer.)

Removal by
perineal
section.

ii. Hindu male, æt. 45. Suffered from pain and difficulty in passing water for fifteen days. Stone detected in urethra, far back. After a vain attempt to remove it by forceps, perineal section was performed, and a stone, the size of a coffee bean, extracted. Recovered in seventeen days. Full-size catheter passed occasionally to maintain patency of canal.

3. VESICAL, BY LITHOTOMY.

Cases, 19; Deaths, 3.

Cases of lateral
lithotomy.

i. Hindu male, æt. 30. Symptoms of $1\frac{1}{2}$ year's duration. Lateral lithotomy; discharged well in 39 days. Uric calculus, weighed 45 grains. (Dr. Palmer.)

ii. Jew, æt. 4. Symptoms of two years' duration. Lateral lithotomy. Weighed 90 grains. Recovered. Discharged in 31 days.

iii. Mahomedan, æt. 36. Stricture and perineal fistula. Stricture dilated by Holt's instrument; fistula included in

incision for removal of stone. Discharged cured in 42 days. Phosphatic stone weighed 210 grains. CHAP. XIII.

iv. Hindu, æt. 40. Stone crushed in first instance, but a large and very hard nucleus remaining, which escaped the grasp of the lithotrite, and the bladder being full of debris, he was cut, the nucleus removed, and bladder washed out. Discharged well in 38 days. Phosphatic and uric stone, weighed 420 grains, exclusive of debris. VIII. 3.
Crushing
followed by
cutting
operation.

v. Hindu, æt. 8. Operation was followed by pelvic cellulitis. Discharged well in 38 days. Oxalate of lime, stone weighed 60 grains. Pelvic
cellulitis.

vi. Male, æt. 40. Two stones removed; no bleeding of consequence either primary or secondary. Died eighteen days after operation, of catarrhal dysentery and bronchopneumonia; wound had contracted and was healing. Weighed 133 grains, composed of oxalate of lime. Fatal case.

vii. Hindu, æt. 6. Recovered in 27 days. Uric calculus, weighed 63 grains.

viii. Hindu, æt. 55. Lithotritry tried in first instance. Stone encysted; edge of cyst ran into grasp of lithotrite; bladder torn in withdrawal. Lateral operation performed. Peritonitis set in on second day. Died three days after operation. Stone phosphatic and uric, size of a hen's egg. Injury of
bladder.
Peritonitis.
Death.

ix. Hindu, æt. 35. Recovered without a bad symptom in 22 days. Oxalate of lime, weighed 220 grains.

x. Hindu, æt. 43. Made water on sixth day; wound closed on eleventh. Discharged in twenty days. Uric calculus, weighed 18 grains.

xi. Hindu male, æt. 35. Symptoms of stone first noticed 25 days before admission. Had retention on the day preceding. Stone impacted in prostatic urethra. Extraction *per urethram* failing, perineal section was performed; calculus slipped back into bladder on trying to catch it. A lateral division of the prostate was made, and a small uric calculus, weighing 15 grains, easily withdrawn. Discharged well in 23 days. Medio-lateral
operation.

xii. Mahomedan male, æt. 35. First symptoms five months ago. Urine frequently stopped; stream diminished; stone felt in urethra. It could not be caught by urethral forceps, and median lithotomy was performed. A small phosphatic stone weighing 9 grains was extracted through. Median
lithotomy.

CHAP. XIII
VIII. 3.

the perinæal wound. Passed water entirely through urethra in six days, and was discharged in 22 days.

xiii. Hindu male, æt. 5. Symptoms commenced when he was a year old: great urinary irritation and temporary obstruction occurred at intervals. A calculus discovered on sounding. Lateral lithotomy was performed, and a uric stone weighing 120 grains extracted. Made water entirely through penis after sixteen days, and was discharged in 23 days. Wound suppurated.

xiv. Mahomedan male, æt. 60. Symptoms of three years' duration; urine alkaline, traces of albumen. Left lateral lithotomy performed; bilateral section of prostate made; stone weighed 1 oz. 6½ drs.; made a good recovery in 37 days.

Medio-bilateral
operation.

xv. Mahomedan male, æt. 60. Symptoms of three years' duration. Patient a feeble old man, addicted to opium, consumed 16 grains a day; stone extracted by median lithotomy with bilateral section of perinæum, weighed 1 oz. 4 drs. 6 grs. Got an attack of diarrhœa about a week after operation. Removed by his friends in a low state on thirteenth day; wound clean. It was subsequently ascertained that the bowel complaint subsided, and he made a good recovery.

Very large
prostatic
calculus.

xvi. Hindu male, æt. 28. Symptoms of three years' duration. Sound impinged on the surface of the stone easily, but could not enter the bladder. Stone felt with unusual distinctness in the situation of the prostate *per rectum*; median section made in the perinæum; a V-shaped incision made in continuation on each side of the rectum. A similar incision opened the prostatic sac, and the stone was extracted by straight forceps. It was found to occupy the prostatic urethra, the bladder being empty and contracted; the stone weighed 4 ozs. 2 drs.; recovery tedious owing to persistence of the perinæal opening. This was cauterized by a hot iron, but a small fistula remained when he was discharged, 132 days after the operation. (See *Indian Medical Gazette*, vol. xvii., 1882, p. 187.)

Large stone.

xvii. Mahomedan male, æt. 30. Symptoms of ten years' duration. Left lateral lithotomy performed, and a stone weighing 4 ozs. 6 drs. extracted with some difficulty; wound became sloughy, and patient suffered from diarrhœa, but eventually a good recovery ensued in 67 days.

xviii. Hindu male, æt. 45. Symptoms of one year's duration. Large stone detected in prostatic part of urethra; removed by perinæal section. A second stone found on exploring the bladder. Wound enlarged, prostate nicked, and stone removed by forceps. Operation followed by no constitutional disturbance; began to make water through penis thirteen days after operation. Perinæal wound had almost closed in 45 days, when he got severe rigor and fever, followed by double pneumonia, which proved fatal in five days. Stone uric; weighed 1 oz. 6 drs. 10 grs.

CHAP. XIII.

VIII. 3-4

Prostatic and vesical calculi.

xix. Hindu male, æt. 50. Symptoms of two years' duration. Lithotrite introduced and stone found too large. Bilateral lithotomy performed, and a calculus weighing 7 ozs. and 3 drs. extracted with great difficulty. Operation succeeded by rigor and fever. He became low and delirious; had hiccough and tenderness over the hypogastrium. Tongue dry, fissured, and coated. He was removed in a moribund state by his relations eleven days after the operation.

Very large stone.

Death.

4. VESICAL, BY LITHOTRITY.

Cases 7; Deaths 0.

i. Mahomedan male, æt. 30. Lateral lithotomy performed a few years ago. Present symptoms recent. Crushing performed in two sittings. Recovered. Discharged in four days. (Dr. Palmer.)

Recurrent calculus.

ii. Ooria Hindu male, æt. 20. Eight months' duration. Small stone causing retention. Crushed; recovered. Discharged in six days.

Single sitting.

iii. Hindu male, æt. 35. One year's duration. Crushed on six occasions. Discharged in 75 days.

Six operations.

iv. Hindu male, æt. 30. Symptoms of 1½ year's duration. A stone about 1½ inch in diameter was discovered on sounding. It was crushed on three successive occasions; the intervals were six and seven days. No attempt was made to evacuate by instruments. Chloroform was given on the first occasion, but not on the last two; very little irritation resulted from these operations, and he left hospital, seven days after the last crushing, quite free of stone and in good health in every respect.

Three operations.

CHAP. XIII.

VIII. 4-5
One sitting.

v. Hindu male, æt. 45. Symptoms of one year's duration. Passed a calculus two years ago. Stone small, and crushed at one sitting under chloroform. A little bleeding and irritation followed, but he left hospital in five days quite relieved of his symptoms. No stone could be detected on careful sounding.

Two operations.

vi. Mahomedan male, æt. 33. Symptoms of two years' duration; patient labouring under phthisis; small stone (probably phosphatic) detected. It was crushed on two occasions at fifteen days' interval. Slight irritation, but no bleeding followed the first operation. Left hospital three days after second crushing, which was done without chloroform; quite relieved. No sign of calculus detected by sound.

Remarks.

These operations (iv.-vi.) were performed with Weiss's lithotrites (Thompson's), Bigelow's instruments not being available. Repeated crushings were resorted to; under chloroform on the first occasions—a fenestrated female blade being first used, and then a solid one. In one case a single operation sufficed; in another a second, and in another a third was necessary. Great help was experienced from the finger *in recto*, which gives precision to the operation, and guides the fragments into the grasp of the lithotrite.

Three operations.

vii. Mahomedan male, æt. 36. Symptoms of two or three years' duration. Stone crushed on three occasions, on 3rd, 10th, and 14th of March; suffered from a smart attack of fever after the first operation; very little vesical irritation. Remained 44 days in hospital.

Bigelow's operation.

5. Litholapaxy.—Mahomedan male, æt. 55. Symptoms of one year's duration. General health feeble. Litholapaxy performed by Dr. R. C. Sanders. Lithotrite introduced thrice and evacuator four times. Operation lasted 30 minutes; followed by strong rigor and fever and pain over bladder; urine ropy, foetid, and ammoniacal. Diarrhœa and prostration ensued. Scrotum and penis became gangrenous before death, which happened 22 days after operation. On post-mortem examination the dura mater and surface of the brain were found to be congested. Upper lobe of right

Death.

lung much congested, and contained a large cavity; decolorized clots in right auricle and left ventricle, pyæmic abscesses in both kidneys. Peritoneum over bladder congested. Bladder hypertrophied and contracted; mucous membrane inflamed and covered with spots of ecchymosis. A piece of phosphatic calculus, size of a horse-bean, found in it, and some minute phosphatic grit; two ragged cavities in base of bladder; urethra lacerated and gangrenous; gangrene extended over Poupart's ligament on right side. Patches of congestion throughout small intestine.

CHAP. XIII.

Post-mortem
appearances.

Comment.—Stone in the urinary passages is infrequent in Calcutta as compared with some other parts of India. Fayrer has tabulated 50 hospital cases in eleven years ("Clinical and Pathological Observations," p. 385). The present record contains 30 cases in five years, in an equal number of beds, or nearly 3·8 of the whole number of operations performed. Appendix A shows 1,012 operations for stone in the hospitals and dispensaries of Lower Bengal in five years, or 7·2 per cent. of the whole; 4,437 in those of the North-Western Provinces and Oudh in the same period, or 11·6 per cent.; and 3,831 in those of the Punjab in four years, or 30·4 per cent. of the whole. Making due allowance for the inequality of the other data contained in these tables, the predominance of stone operations in the provinces, as compared with the capital, is very strikingly illustrated. The present series includes three urethral and 27 vesical calculi: of the latter, nineteen were removed by a cutting operation; seven were crushed without artificial evacuation, and one crushed at one sitting, and the fragments removed by aspiration after the manner of Bigelow—litholapaxy. Of the urethral cases, one went wrong, and was removed apparently in a dying state. Of the nineteen cases of lithotomy, three died in hospital, and one was taken away in a moribund state, and most probably died at his home. The mortality among the nineteen cases was therefore, including the

Stone uncommon in
Calcutta.Very common
up country.

Mortality.

CHAP. XIII. moribund case, 21 per cent. The mortality from lithotomy shown in Appendix A was—for Lower Bengal, 9·6; the North-Western Provinces, 8·9; and the Punjab, 12·6. These are very good results, and the Calcutta figures contrast unfavourably with them.

Mortality in the Provinces. Fayrer's mortality was 28 per cent. He attributes the excess over the provincial death-rates to "an unhealthy state of the patients, or to unfavourable hygienic conditions," and points out that many patients delay applying for relief until the stones have become very large, and the patients' general health has become very gravely compromised. Probably these causes of difference are still in existence. The causes of death in the present series were as follows:—One died of dysentery and broncho-pneumonia eighteen days after operation, the wound being healthy and healing. Another died of peritonitis, due to injury of the bladder. This case will be further alluded to presently. A third died of pneumonia 45 days after operation, the wound having almost closed; and the fourth was the subject of a very severe and protracted operation for a large stone weighing 7 ozs. 3 drs., and the unfavourable symptoms, which probably resulted in death, were no doubt due to unhealthy inflammation about the neck of the bladder. In no case, except perhaps the last, was the fatal result due to septic disease. Of Fayrer's fourteen deaths, six, or nearly one-half, were due to erysipelas and pyæmia. As no antiseptic precautions, except washing out the bladder and wound with carbolic lotion, were adopted in my cases, the absence of septic disease may fairly be attributed to the improved hygienic condition of the hospital, of which I have written in Chapter II. In twelve cases the stone was removed by the lateral operation, in four by the bilateral, and in two by the median. In one of the bilateral cases the stone, a large one weighing 4½ ozs., was situated in the prostatic urethra. In one of the median cases also, a stone of considerable size was found

Fayrer's death-rate.

Causes of death.

Diminution of septic causes.

in the same situation, and another, smaller, subsequently discovered in the bladder, and removed. Case viii. was really one of prostatic calculus. The lithotrite pushed the stone into the bladder, and the neck of the bladder rushed into the grasp of the instrument; it was found impossible to disengage it, and in withdrawing the instrument, the base of the bladder was unfortunately wounded just behind the neck. This was ascertained by post-mortem examination. The seven cases of lithotrity were all successful; but the case of litholapaxy proved fatal. The operation was performed, at my request, by Surgeon-Major R. C. Sanders, who had had much experience and good success with this operation in the North-Western Provinces.

CHAP. XIII.

An unfortunate accident.

This operation is likely to become a very popular and successful one in India, and very interesting series of cases have been published by Drs. Sanders, Freyer, and Keegan, in the *Indian Medical Gazette* (vol. xvi. pp. 54, 191, 286, and 338; vol. xvii., p. 311; vol. xviii., pp. 29 and 68; and vol. xix., pp. 61 and 131), exhibiting excellent results.

Statistics of litholapaxy.

The figures recorded by these gentlemen are shown in the following abstract:—

Reporter.	Number of Cases.	Number of Deaths.	Percentage of Deaths.
Dr. Sanders	46	4	8·7
Dr. Freyer	77	3	3·9
Dr. Keegan	60	8	13·3
Total ...	183	15	8·2

CHAPTER XIV.

OPERATIONS FOR HERNIA.

Cases, 64 ; Deaths, 12.

IN addition to the cases included in this section, Chapter X. gives particulars of eight cases of scrotal elephantiasis complicated with hernia, in which an operation was performed for the cure of the hernia in addition to that performed for the removal of the scrotal tumour. Of these eight cases four died. The whole number of hernia operations included in this record is 72, with sixteen deaths, classified as follows:—

Classification
of cases.

Description of Cases.	Number of Operations.	Number of Deaths.	Percentage of Deaths.
1. Cases of hernia complicated with scrotal elephantiasis...	8	4	50
2. Operations for strangulation...	18	9	50
3. Operations for radical cure, by Wood's method	17	1	6.2
4. By antiseptic ligature and re- moval of sac	29	2	6.9
Total ...	72	16	22.5

Operations for
strangulation.

The second of these groups differs from the other three in two very important particulars, inasmuch as (1) the operation was resorted to for the purpose of saving life, and (2) the parts concerned in the operation had undergone, before the operation, changes which in most cases seriously compromised their vitality and added materially to the risk. In the other groups the operation was undertaken for the purpose of removing

a deformity and inconvenience, and obviating a possible, in some cases probable, danger to life, rather than necessitated by a present and imminent chance of death; and the parts, though in an unnatural state and occasionally bearing traces and results of previous disease, did not present at the time of operation any recent or acute pathological disturbance.

CHAP. XIV.
For radical
cure.

Group 1 differs from groups 3 and 4 in that the hernia operation was associated with one entailing of itself considerable risk and adding materially to the risk of the other. In groups 3 and 4 the motives to operation and the circumstances of patients and parts were very similar, if not identical; but the method of operating was different. Group 1 has been already discussed. Group 2 will be considered separately, in view of the special circumstances compelling operation. Group 3 admits of separate study; but as the steps of operation resorted to in the cases included in group 4 were also adopted in most of the cases included in groups 1 and 2, it will be necessary to review them again in this light; and I am enabled to add to these a few cases which occurred in the hospital during the first four months of 1884.

I. FOR STRANGULATED HERNIA.

IX. 1. a.

Cases, 18; Deaths, 9.

a. WITHOUT OPENING SAC.

- i. Jew, æt. 60. Ruptured 50 years ago. Down for 21 hours. Irreducible, tense, painful, distended with serum; symptoms of strangulation not extreme; taxis tried in vain with chloroform and ice. Herniotomy without opening sac; stricture at external ring. Recovered. Relief of strangulation without opening sac.
- ii. Hindu male, æt. 30. Right inguinal hernia of ten years' duration. Descended an hour before admission. Taxis with and without chloroform tried in vain; opium enemata, and continuous application of ice employed for five hours without effect. Sac exposed; stricture at external ring

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CHAP. XIV.	divided; contents returned without opening sac. Sac
IX. 1. a. b.	invaginated and secured in canal by catgut loop passed
Sac invagi- nated and pillars sutured.	through abdominal wall, opposite internal ring; pillars and sides of canal brought into contact with three strong catgut sutures; ends left long for drainage; skin wound stitched with horsehair. Restless and delirious during first night; removed dressings and exposed wound. Had two motions
Suppuration.	containing blood. Scrotum swelled, and suppurated; counter-opening made, through which in time a large mass
Sloughing of sac.	of membranous slough (? the sac) was removed. Drainage tube passed through suppurating tract, which eventually granulated, the wound having been rendered aseptic by iodine injections. Discharged in 57 days with depressed cicatrix at fundus of scrotum, which was of natural size; oval depressed cicatrix in groin; a large mass of in- durated cicatricial material in canal and around cord;
Recovery.	no hernial impulse nor descent. Apparently a thorough radical cure. (See <i>Indian Medical Gazette</i> , vol. xvi., 1881, p. 261.)

b. WITH OPENING SAC.

Gangrene of intestines.	iii. C.M., Manila seaman, æt. 45. Hernia down for 31 hours. All the symptoms of strangulation and peri- tonitis; very low. Sac laid open; intestines gangrenous.
Death.	No adhesion at neck of sac. Died in six hours.
Strangulated omental hernia.	iv. Native Christian, æt. 27. Painful swelling of right inguinal region, with obstructed bowels for four days before admission. Right testicle in inguinal canal. Continued to suffer from pain and obstruction, and symptoms of strang- ulation supervened. The sac was opened. It was found to be a congenital omental hernia, the obstruction being caused by doubling of the bowels, and the omentum, which was almost gangrenous, was adherent to the fundus of sac.
Amputation of omentum.	The omentum was tied at the neck of the sac with catgut, and removed; the gut being liberated and reduced. The edges of the sac and wound were carefully stitched with
Suppuration.	catgut. The wound suppurated, gaped, and healed by granulation. An abscess of the abdominal wall afterwards formed, which was treated antiseptically with success. The operation proved a radical cure of the hernia. Patient has

been repeatedly seen, and there has been no return of the disease. Discharged 62 days after operation. Full details of this case are given in the *Indian Medical Gazette*, vol. xv., 1880, p. 163.

CHAP. XIV.

IX. 1. b.

Recovery with radical cure.

v. Mahomedan male, æt. 35. Left oblique inguinal hernia; 30 years' duration. Irreducible for 48 hours. Some symptoms of strangulation. Ice and taxis under chloroform having failed, herniotomy was performed, followed by Wood's operation, under antiseptic precautions; pillars were brought together with double catgut thread in addition to wire. Latter removed on eleventh day; wound putrefied, suppurated, and healed by granulation. No descent of hernia during the 40 days he remained in hospital after operation.

Herniotomy and Wood's operation.

Successful result.

vi. Hindu male, æt. 36. Oblique inguinal hernia of left side; of three months' duration, three days down; symptoms of strangulation almost amounting to prostration. Sac laid open; intestine adherent to sac; sloughy opening at one part. Dressed for artificial anus. Died next day with symptoms of peritonitis.

Gangrene of intestines.

vii. Hindu male, æt. 58. Right inguinal hernia of seven months' duration. Irreducible for 58 hours before admission. Size of fetal head; tense and painful. Ice applied, and taxis tried without effect, with and without chloroform; vomiting, restlessness, feeble pulse, cold extremities, clammy perspiration. Operation performed fifteen hours after admission. Sac exposed by oblique incision over external ring. Hernia could not be reduced.

Sac laid open. Contained omentum and intestine. Latter could not be reduced till former was removed, after ligature in sections with catgut. Contents of hernia then replaced in peritoneal cavity; neck of sac tied with three loops of catgut; stump placed in inguinal canal; body amputated. Pillars and sides of canal brought together over cord with two double catgut stitches; ends left long for drainage. Skin wound brought together with iron wire and horsehair. Operation performed with antiseptic precautions. Never rallied. Vomiting and symptoms of collapse became aggravated. Died of shock eight hours after operation.

Amputation of omentum.

Ligature and removal of sac.

Death by shock.

viii. Mahomedan male, æt. 45. Right oblique inguinal hernia (scrotal) of ten years' duration. Came down eight

CHAP. XIV.

IX. 1. b.

Gangrenous
cæcum.Death by
shock.

hours before admission; painful, tense, and cedematous locally. Suffering from vomiting, tympanitis, hurried breathing, dry coated tongue, and symptoms of collapse. Ice applied for three hours, and taxis tried under chloroform without effect. A small hydrocele was emptied, and the hernial tumour punctured in three places, but it still resisted reduction; sac exposed, and laid open. Cæcum found in a gangrenous state. It was opened, and a large hæmatoma found in its interior; on emptying this the gut returned. The edges of the opening were stitched to those of the wound, and a boracic dressing applied. Patient became restless, and suffered greatly from shock after the operation. Breathing hurried, pulse almost imperceptible. Abdomen swelled and became tender. He died in twelve hours.

Amputation of
omentum.Ligature and
removal of sac.

Aseptic case.

ix. Hindu male, æt. 40. Right inguinal oblique hernia (scrotal epiplocele). Four years' duration. Descended four days before admission. Taxis tried in vain, with and without chloroform, before and after admission. Suffered from vomiting and obstruction of bowels, and increasing local tenderness. Pulse regular, good strength; surface warm; tongue furred, moist; general health good. Tumour tense, painful, dull on percussion, and fluctuating. Hydrocele fluid withdrawn from lower part by a fine trochar, and sanguineous serum from upper. Oblique incision in right groin, coverings divided serially, sac opened. Sanguineous serum gushed out, and strangulated omentum presented. Latter pulled down till healthy structure came into view; tied with four catgut ligatures at line of demarcation, and strangulated portion amputated. Sac dissected out, tied at neck, and removed. Stump reduced into canal, and pillars and sides of canal brought together by four-ply catgut sutures, ends left long for drainage. Operation performed under strict antiseptic precautions. Temperature never exceeded 100°, and became normal in four days. Vomiting subsided. Bowels became regular in fifteen days. Required two doses of castor-oil before then; wound remained aseptic; discharge gradually became lymphic and scanty. Drain came away in twelve days, wire stitches removed in eight, and horsehair in eleven days. Wound healed in fifteen days.

Remained 48 days in hospital. Centre of cicatrix depressed, adherent to an indurated mass occupying canal. Superficial ring firmly adherent to cord. No impulse nor descent. Hydrocele tapped and injected successfully before he left hospital. Not heard of since. The case is narrated at length in the *Indian Medical Gazette*, vol. xvii., 1882, p. 138.

CHAP. XIV.

IX. 1. b.

Satisfactory result.

x. Hindu male, æt. 35. Oblique inguinal hernia (right) of seven years' duration. Came down six hours before admission; vomited thrice; swelling tense and painful. Taxis with ice and chloroform applied without avail; 1 oz. of sanguineous fluid withdrawn by fine canula. Very anxious and restless; perspiring freely. Bowels obstructed. Performed twelve hours after descent. Sac laid open; congested; contained a coil of congested small intestine and very fat mesentery. Gut emptied and reduced. Sac dissected out and tied at neck; pillars, &c., ligatured in the usual way. Operation performed antiseptically. Obstruction continued, with dry retching and free perspiration. Abdomen became tympanitic and thoracic viscera were compressed. In four and a half days the operation of laparotomy was performed, seat of obstruction found, gut liberated and intestine punctured. Died in ten hours after second operation—five and a quarter days after the first. Recent peritonitis and paralysis of intestines. Herniotomy wound aseptic and in process of satisfactory repair. This case is fully detailed in the *Indian Medical Gazette*, vol. xvii., 1882, p. 189.

Herniotomy.
Ligature and removal of sac.

Laparotomy.

Inflamed intestine scraped and returned.

Ligature and removal of sac.

xi. Hindu male, æt. 40. Right oblique inguinal hernia of five years' duration. Descended six hours before admission; tapped, and sanguineous fluid removed; ice applied; reduced after six hours. Came down again after a fortnight. Partly reduced after tapping. Symptoms of prostration—cold sweat, feeble pulse, &c. Sac laid open. Knuckle of small intestine found acutely inflamed, bent at an acute angle; limbs of angle glued to each other and to mesentery. It was stretched, lymph peeled off, and reduced. Sac and canal dealt with as in case a. Operation done antiseptically. Wound remained aseptic for a week; then putrefied and suppurated and gaped; matter formed in canal. Healed slowly by granulation. Constitutional symptoms gradually improved under treatment. Bowels

CHAP. XIV.

IX. 1. b.

Satisfactory
result.

became regular; strength and flesh returned. Remained in hospital 66 days. Depressed cicatrix in right groin; canal and outer ring firmly adherent to cord; no descent or impulse; abdominal wall lax. Discharged with a truss as a precaution. Seen ten months after discharge in excellent health; no descent of hernia. Full details are given in the *Indian Medical Gazette*, vol. xvii, 1882, p. 252.

Adherent
omentum.Ligature and
removal of sac.

Aseptic case.

Satisfactory
result.

Herniotomy.

Ligature and
removal of sac.

Death.

xii. Hindu male, æt. 32. Congenital hernia, right side. Came down twelve hours before admission; irreducible. Patient restless; vomited thrice after admission. Bowels acted after enema. Ice and taxis applied without avail; 7 ozs. of clear fluid removed by canula. Sac exposed; external ring nicked; contents partly reduced; sac laid open; full of omentum adherent by a band to bottom of sac; band tied and divided; omentum returned. Sac dissected off, tied at neck and removed; testes and cord pulled out of scrotum; returned after trimming; and stitched to fundus of scrotum. Sides of canal brought together as usual; drainage tube passed from wound through incision in fundus of scrotum. Pursued aseptic course. Dressings changed after one, three, four, three, and three days; wire stitches removed in eight days, and horse-hair in eleven. Drain came away in fourteen. Healed by first intention. No inflammation. Discharged 25 days after operation. Parts consolidated; linear cicatrix in groin; ring closed; no impulse; no sign of descent. (See *Indian Medical Gazette*, vol. xvii, 1882, p. 227.)

xiii. Hindu, æt. 45. Left oblique inguinal hernia. Down 48 hours; very tense and tender. A small quantity of sanguineous serum removed by tapping; very restless and anxious; vomited. Ice applied for five hours and taxis tried without effect. Sac exposed and opened; contained congested omentum and a knuckle of large intestine; both reduced. Several bands of adhesion between omentum and interior of sac divided. Sac dissected out, ligatured at neck, and removed. Pillars, &c., brought together with catgut. Suffered from shock, which was succeeded by prostration. Abdomen became tympanitic; hiccough set in; got stercoraceous vomiting; temperature subnormal. Died of exhaustion five days after operation. On dissection the

intestine, which had been herniated, was found to be gangrenous. Septic peritonitis had occurred. Omentum had retained vitality. CHAP. XIV.
IX. 1. b.

xiv. Hindu male, æt. 40. Admitted with strangulated right inguinal hernia. Was subject to a permanent swelling in right groin, which had become suddenly larger, with pain, on the morning of day of admission, when he was returning from bathing in a tank. Taxis applied and tumour reduced in size. Some material remained in the sac, apparently solid. Bowels opened by enema; vomited thrice between ten P.M. and four A.M. Abdomen tympanitic, pulse excited. Reduction being incomplete and symptoms of obstruction existing, operation was resorted to. An oblique incision made over right cord. Sac exposed, and, reduction being still impossible, opened. It contained an empty knuckle of small intestine and some omentum and mesentery. Intestine much congested and ecchymosed. Stricture in neck of sac. This was divided and the contents returned. The slit in the neck of the sac was stitched, the neck tied, and the rest of it dissected out and amputated. Boundaries of canal brought together by catgut ligature and external wound sutured. Operation performed under strict antiseptic precautions, and wound dressed with boracic lint and carbolic gauze. Tympanitis gradually subsided. Wound remained aseptic and healed by first intention, except where drain emerged. Had fever on third, fourth, and fifth days; subsided under salines. Again on eighth day. Bowels became regular; some tendency to looseness. Symptoms of tetanus appeared nine days after operation. The disease quickly assumed a severe form, and proved fatal on next day—ten days after operation. Omental adhesions were found opposite the external wound. A coil of small intestine was also adherent in this position, its wall softened and about to give way. No general peritonitis. Left lung in state of red hepatization throughout. The case is related at length in the *Indian Medical Gazette*, vol. xviii., 1883, p. 259. Strangulated
entero-epiplo-
cele.

Herniotomy.

Ligature and
removal of sac.

Tetanus.
Death.
Post-mortem
appearances.

xv. Mahomedan male, æt. 60. Oblique right inguinal hernia, of one month's duration; came down thirteen hours before admission, and could not be reduced. Abdomen tympanitic; hiccough, but no vomiting. No stools since

178 OPERATIONS FOR STRANGULATED HERNIA.

- CHAP. XIV. descent. Pulse small, feeble, excited; tumour dull, no impulse. Taxis after ice failing, herniotomy was performed
IX. 1. b. eighteen hours after descent. Sac opened; contained 2 ozs. of dark offensive fluid, a coil of small intestine $4\frac{1}{2}$ inches long, and some omentum; stricture in neck of sac. Omentum reduced. Bowel soft, gave way under manipulation. The
Gangrenous bowel. gangrenous bowel was excised, and the orifices stitched together and to the neck of the sac by continuous catgut
Operation for artificial anus. suture for artificial anus. No feces came for two days. Rectal bougies were passed through the proximal orifice, and a few ounces of feculent material followed. Became low
Death. and had stercoraceous vomiting. Died of obstruction and prostration four days after operation. On post-mortem
Post-mortem appearances. examination, the ends of the bowel were found united together and to the neck of the sac by lymph; no feculent material in peritoneal cavity; acute peritonitis; small intestine distended, congested, and adherent; fibrinous coagula in the cavities of the heart.
- Protracted strangulation. xvi. Mahomedan male, æt. 55. Right oblique inguinal hernia, of five years' duration; six days down. Tumour hard, dull, tender, without impulse; abdomen tympanitic; countenance anxious; pulse small, feeble, and frequent; stercoraceous vomiting; bowels obstructed. Sac exposed and opened; containing 10 ozs. of sanguineous serum and 3 inches of deeply congested small intestine. An enlarged mesenteric gland impeded reduction; stricture in neck of sac freely divided. Sac dissected out, ligatured at neck, stump reduced; pillars brought together and wound sutured. Counter-opening made in scrotum and drainage tube inserted. No sign of improvement followed the operation, except that several loose stools were passed. Vomiting continued, and the abdomen remained puffed and tender.
Operation. Sank exhausted four days after operation. Post-mortem
Death. examination not permitted.
- Double hernia. xvii. Mahomedan male, æt. 60. Double scrotal hernia, of 20 years' duration. Both descended six days ago, and could not be reduced. Bowels had not acted since descent; vomiting stercoraceous material; hiccough setting in; abdomen tympanitic. Temperature 97.2° ; pulse small and frequent. Right hernia hard, tender, without impulse; left loose. Labouring under double hydrocele. The hydrocele

of the right side was tapped and emptied. Sac exposed and opened; contained a large quantity of sanguineous serum and 4 inches of congested and inflamed small intestine; stricture outside of sac freely divided. The intestine was denuded of lymph and returned. A finger was passed into the opposite sac, and traction from within combined with taxis failed to empty the sac. The left hydrocele was also tapped and emptied. The right sac was next dissected out, tied at the neck, and the stump reduced. The pillars were brought together with catgut and the wound stitched. A counter-opening was made in the scrotum and a drainage tube inserted. The operation was followed by high fever, sloughing cellulitis in the neighbourhood of the wound, and symptoms of peritonitis. These symptoms subsided in fourteen days, and the wound became clean and began to granulate. The other rupture was returned by taxis seventeen days after operation. A few days after, a collection of matter was found in the scrotum and freely laid open. The wound healed, and the patient was discharged 49 days after operation, with a double truss. The canal on the right side seemed to be obliterated, and no sign of reproduction of hernia existed when he left the hospital. The left hernia was fully commanded by the truss. Full details of this important case will be found in the *Indian Medical Gazette* for February 1884.

CHAP. XIV.

IX. 1. b.

Operation on right side.

Return of left rupture.

Recovery.

xviii. Hindu male, æt. 60. Left oblique inguinal hernia, of fifteen years' duration; down fifteen hours. Bowels obstructed; vomited four times; abdomen tympanitic; pulse not much disturbed; tongue moist. Taxis with ice and chloroform failing, the sac was exposed, stricture outside of neck divided, and contents relieved; something remained in the sac and it was opened. This was found to be omentum, which was adherent to the inside of the neck and to the herniated bowel, whose coils were also adherent. Adhesions were separated by knife and finger; several vessels requiring ligature. The sac was next dissected out, tied at the neck and amputated, and the operation completed in the usual way. Operation followed by slight reactive fever. Wound remained aseptic and healed mostly by first intention. Patient left hospital after 26 days with a fine linear cicatrix in left groin, and no apparent tendency to recurrence.

Adherent omentum.

Operation.

Aseptic result.

CHAP. XIV. Canal firmly closed. The case has been recorded in greater detail in the issue of the *Indian Medical Gazette* for February 1884.

Fayrer's
experience.

Age.

Greater frequency of
right hernia.

The majority
old cases.

Duration of
strangulation.

Comment.—These eighteen cases present many features of considerable interest. Sir Joseph Fayrer has placed on record in the works so frequently cited ("Clinical Surgery," p. 435, and "Clinical and Pathological Observations," p. 333), 34 cases of strangulated inguinal hernia in which an operation was performed to relieve strangulation, 29 of which were treated in the Medical College Hospital and five in private practice, which admit of useful comparison with the present series. It will be observed that the majority of the cases occurred among middle-aged men, the extremes being 27 and 60, and the mean age 43. In Fayrer's series they were 25 and 70, and the mean 45. In both series all the subjects were males, and all the herniæ oblique and scrotal. Among my cases eleven were on the right side, four on the left, one was double (the right strangulated), and in two the side is not recorded. Among Fayrer's, 21 were right, ten left, and in three the side is not noted. The great preponderance of right herniæ is therefore very conspicuous in both series.

In the great majority of the cases in both series the hernia was of long standing. In only three of my cases and five of Fayrer's was the duration under a year, and in some cases 10, 15, 20, 30, 50 years are noted. Two of my cases were congenital, a descent through a patent processus vaginalis; but none of Fayrer's appear to have been of this kind. The duration of incarceration and strangulation previous to admission or operation varied very considerably, from a few hours up to six or seven days. Fayrer remarks that natives suffering from incarcerated and strangulated hernia too often postpone resort to hospital until it is too late to save their lives, and that symptoms of

strangulation are apt to be less acute and severely felt in them than in Europeans. He also demonstrates by the evidence of cases the great proneness of the herniated parts to undergo gangrene in natives of Calcutta, and founds on this circumstance a strong opinion in favour of early recourse to operation. My experience, both in hospital and private practice, entirely supports this view, and although I have repeatedly operated when the indications therefor seemed somewhat questionable, I have never in any single case seen reason to regret having done so. He also observes that scrotal herniæ are frequently associated with diseased conditions of the scrotum tunica and testes, rendering the parts very prone to undergo suppurative inflammation after operation. This point I have also verified, but I have found that antiseptic management, with suitable arrangements for efficient drainage, materially reduce the risk of this contingency.

CHAP. XIV.

Proneness to gangrene in natives.

Concomitant disease of scrotum, &c.

A very large number of cases of irreducible hernia apply for relief at the Medical College Hospital which fortunately are not represented in these tables. These are cases of old herniæ, which become incarcerated from sudden and excessive descent, or from distension by faecal and gaseous accumulations. Some of them yield to taxis under chloroform at once; many others are easily reduced after the application of ice for a few hours, and this has become the universal practice of the hospital in cases which do not present urgent local or constitutional symptoms of strangulation. Other measures, such as the warm bath, opium, warm enemata, aspiration, &c., are also employed according to circumstances; but ice and chloroform are undoubtedly the most efficient aids to the taxis which we possess.

Ice and chloroform as aids to taxis.

Natives are very awkward and remiss in the use of the truss. Either they can't afford to purchase one, or they procure an old or ill-fitting instrument, or they fail to appreciate the importance of habitually wearing it, or the swollen state of parts from elephantiasis or

Natives averse to trusses.

CHAP. XIV.

hydrocele renders the use of a truss difficult or impossible. Thus it happens that incarceration is a frequent event with the subject of hernia in India, and the need of operative interference to remedy or prevent strangulation is stronger than with persons who understand and appreciate the importance of habitually using a well-fitting truss for rupture.

Mortality.

Question of opening the sac.

From these facts and considerations it will be gathered that the cases in which operations are performed for strangulation are in most instances of a very serious description, and that the mortality is correspondingly high. Of the eighteen cases above narrated, nine proved fatal, or 50 per cent. Of Fayrer's 34 cases, nineteen recovered and fifteen died, or 44·1 per cent. But between the two series there is this very noteworthy difference, that whereas in mine the sac was opened in sixteen instances, and not opened in two, in Fayrer's the sac was only opened in eight instances, and the hernia returned without opening the sac in 26; the operation consisting simply in exposing the neck of the sac, dividing any constriction which was found to exist outside of it (generally at the external ring), and then reducing the tumour by taxis. The nine deaths which occurred in my practice took place among these sixteen cases; the two in which the sac was not opened recovering; whereas in the other series all the eight cases in which the sac was opened ended fatally, and among the 26 cases in which it was not opened, seven deaths took place. My habit now is invariably to open the sac in every operation which I perform for hernia. This can be done with impunity under antiseptic precautions. I have never met with a fatal case yet in which I could attribute death to opening the sac, and I have repeatedly found that on opening it, conditions otherwise undiscoverable have been found to exist, which proved the opening to be a wise measure.

I have very rarely found it necessary to incise the

neck of the sac. I believe that irreducibility more frequently results from the state of the contents of a hernia than is generally admitted, and that, especially in old herniæ, too much importance is attached to strictures of the sac or outside of it. Opening the sac and exposing its contents enables the operator to deal with these conditions effectively, whether they result from adherent packed and matted omentum, excessive distension by feces or flatus, congestion of mesentery, &c. &c. The contents are in fact in such cases, as it were, buttoned into the sac, and the buttoning has to be undone by direct manipulation. In five of Fayrer's cases an operation was resorted to for radically curing the rupture. The operation employed was a modification of Wutzer's, and an interval of from thirteen to thirty days elapsed between the two operations, the second being inapplicable until the wound had healed. The second operation was only practised in cases in which the sac had not been opened, and in four of the cases no fresh protrusion had occurred when the patient was discharged after a considerably prolonged residence. It is now known that operations for hernia having invagination for their principle do not confer permanent relief. In thirteen of my eighteen cases steps were taken at the time of operation to prevent the return of the hernia. In one case the sac was invaginated and held up by a loop catgut passed through the wall of the abdomen at the level of the internal ring, and the pillars subsequently brought together by catgut. In another Wood's wire operation was performed, and in eleven the neck of the sac was tied with catgut, the fundus removed, and the pillars brought together. The results of this measure will be fully discussed below. In this place I would point out that it does not add much to the time or trouble or risk, and offers two undoubted advantages—namely, (1) the shutting of the peritoneal cavity from all chance of septic infection *via* the wound, and

CHAP. XIV.
Causes of
irreducibility.

Operation for
radical cure
superadded.

Advantages of
tying and
removing the
sac.

CHAR. XIV.

(2) the certainty of preventing re-formation of that rupture, and a fair hope of preventing the formation of another.

Causes of death.

Gangrene of bowel.

Turning now to the causes of death, it will be observed that in four of the fatal cases (iii., vi., viii., and xv.) the intestine was found gangrenous, and the only hope of cure consisted in the establishment of an artificial anus—an event which I have known to occur spontaneously in cases of strangulated hernia. They all succumbed: one in six hours, of collapse; one in 24 hours, of peritonitis; one in twelve hours, of collapse, and one in four days, of peritonitis. In two other cases, which died of peritonitis in five days (xiii.) and tetanus in ten days (xiv.), the intestine was found gangrenous on post-mortem examination. In the latter case the external wound was undergoing aseptic repair. Of the three remaining cases, one (vii.) never recovered from the collapse caused by the strangulation; another (x.) died of obstruction due to paralysis of the intestine. In this case laparotomy was performed in the hope of detecting and relieving the causes of obstruction, and the third (xvi.) gradually sank, death being apparently accelerated by peritonitis.

Other causes.

Death due to the strangulation rather than the operation.

From these details it is quite clear that the fatal result in these cases depended not on the operation but on the strangulation. Even when so slight an operation is performed as simply exposing the sac and dividing a few fibres of the outer ring, death may still occur from the effects of the strangulation, as in the seven cases in Sir Joseph Fayrer's series to which I have alluded. Indeed, I can recall two cases in which death took place from abdominal complication after the hernia had been reduced by taxis without any operation. Most of the cases that recovered presented features of much interest, and some of them of considerable anxiety.

Congenital hernia.

The two congenital cases recovered, though the operations were of great severity. In one (iv.) a con-

siderable quantity of omentum had to be removed after CHAP. XIV.
 ligature in sections with catgut; in the other (xii.) the
 testicle was taken out of the scrotum and replaced
 after the redundant tunica had been trimmed. This
 case pursued a typical aseptic course. In several other Amputation of
 cases omentum was ligatured and divided or removed omentum.
 without evil result. Case xi. is remarkable in that a
 small knuckle of intestine was glued at an acute angle
 by inflammatory lymph. The gut was straightened
 and the lymph scraped off, and perfect recovery
 resulted. In case xvii., where two herniæ existed—
 one strangulated and the other incarcerated—an
 attempt was made, after the strangulated rupture had
 been reduced, to return the other by combining *traction* Traction from
from within with taxis from without. The effort within.
 failed, but positive evidence was obtained of the
 absence of stricture, and the contents were subsequently
 reduced by the gradual operation of cautious bandage
 pressure. The utility of aspirating the tumour with Aspiration.
 a fine needle was illustrated in many instances as a
 means of diagnosis and aid to taxis. The character of
 the fluid removed in this way from a hernial sac is the
 very best evidence procurable of the state of the incar-
 cerated parts. The removal of this fluid, which often Use of tapping.
 accumulates in the sac in considerable quantity, relieves
 tension and facilitates reduction. Flatus can also be
 removed from the interior of the gut in the same way,
 and with similar result. For the same reason I always
 empty a hydrocele before resorting to taxis. In some
 cases of impacted epiplocele, when no symptoms of
 strangulation existed, I have found the use of an elastic Elastic
 bandage of service; but in cases in which symptoms, bandage.
 local or constitutional, suggest doubt as to the existence
 of serious mischief, impending or actual, the sooner the
 sac is opened and its contents examined the better.
 The use of antiseptics renders this a less formidable
 and dangerous measure than it was accounted in pre-
 antiseptic times.

2. FOR RADICAL CURE OF HERNIA.

*Cases, 45; Deaths, 3.**a. WOOD'S OPERATION.**Cases, 17; Death, 1.*IX. 2. *a.*Two
operations.

i. ii. Mahomedan male, *æt.* 50. Ruptured twelve years ago. Right inguinal hernia. Been down for four days. No symptoms of strangulation. Reduced by taxis under chloroform; large hydrocele on the same side. Wood's operation performed antiseptically on two occasions. Effusion of lymph on first occasion moderate; hernia still descended on coughing or exertion. Success complete on second occasion. Interval between operations, 45 days.

iii. Irishman, *æt.* 35. Five years' duration. Hernia the size of an orange. Recovered. (Dr. Palmer.)

Sloughing of
scrotum from
violent taxis.

iv. Hindu male, *æt.* 39. Came in with hernia testis consequent on sloughing of scrotum caused by violent taxis. By careful strapping and dressing, the testes were completely covered with skin. Wood's operation performed when wound healed, antiseptically. Abundant effusion; no suppuration. Discharged apparently quite cured one month after operation.

Elastic
bandage.

v. Mahomedan male, *æt.* 35. Right oblique inguinal, of five years' duration; incarcerated for fifteen days before operation; reduced by pressure of elastic bandage after purgatives, ice, and taxis under chloroform had failed. Wood's operation performed under antiseptic precautions; wire removed on 10th day; wound suppurated. Considerable contraction of ring occurred, but the rupture came down after the wound had healed. Discharged with a truss in 48 days.

vi. Mahomedan male, *æt.* 50. Right oblique inguinal hernia, of six months' duration. Wood's operation performed antiseptically; wire removed on twelfth day; wound healed in a fortnight. Canal much contracted. Discharged with a truss in 26 days.

vii. Mahomedan male, *æt.* 50. Oblique inguinal hernia, of one year's duration. Wood's operation performed antiseptically; wire removed on ninth day; wound suppurated.

No descent of hernia while in hospital. Provided with a truss. Discharged in 32 days. CHAP. XIV.
IX. 2. a.

viii. East Indian male, æt. 37. Right oblique inguinal hernia of one year's duration. Wood's operation performed antiseptically; wire removed on eleventh day; wound healed in sixteen days. No descent of hernia took place. Discharged with a truss in 34 days.

ix. Re-admitted next day after discharge. Hernial protrusion took place after he began to walk about. Operation repeated antiseptically six days after admission; wire removed in eleven days; wound healed in three weeks. Discharged in 30 days, apparently cured. Second operation.

This man was admitted a third time with slight hernial protrusion, and subjected to a third operation. The result will appear below (Case IX. 2. b. viii. p. 192). Third operation.

x. Mahomedan male, æt. 40. Oblique inguinal hernia of right side, of one year's duration. Had also a hernia on left side. Latter operated on on the 7th July; wire removed on 17th (ten days); healed in three weeks. Three operations on the same subject.

xi. Right side operated on on 20th July; wire removed on 4th August (fifteen days).

xii. Operation repeated on left side, 25th August, on account of descent of hernia; wire removed on 7th September (twelve days). A double catgut ligature was placed on the pillars in addition to the wires. Healed on 25th September. Wound remained aseptic in all three operations; suppurated on last occasion. Hernia descended on both sides, although Failure. canals and rings underwent contraction. Provided with a truss. Left hospital 84 days after first operation.

xiii. Native Christian, æt. 30. Left oblique inguinal hernia, 1½ year's duration. Patient suffering from bronchitis and heart disease; hernia constantly coming down. Operation performed antiseptically. Catgut ligature passed through pillars in addition to wire; coughed much during operation. Symptoms of strangulation and peritonitis observed next day. These increasing, the wound was re-opened on third day. During operation and while slightly under chloroform, patient vomited and died suddenly on the table, of asphyxia. A portion of the sac had remained in the Fatal case.

CHAP. XIV.

IX. 2. a.

scrotum, and a loop of intestine had been forced into it by the constant coughing, which had become strangulated.

xiv. Mahomedan male, æt. 70. Left oblique inguinal hernia, of three years' duration; ring very large; constant descents; operation performed antiseptically; wire removed in 21 days. Left hospital in 44 days. No descent of hernia.

xv. American male, æt. 40. Left oblique inguinal hernia; seven years' duration; ring admitted two fingers. Operation performed antiseptically; wound suppurated; wire removed after eleven days. Wound healed in 37 days. Hernia descended two days after. Discharged in 57 days, wearing a truss.

xvi. English seaman, æt. 47. Right oblique inguinal hernia, of seventeen years' duration; ring admitted three fingers. Wood's operation performed antiseptically. Remained in hospital 132 days. Hernia returned; canal contracted, and truss more effective.

xvii. European seaman, æt. 40. Right oblique inguinal hernia of fifteen days' duration; ring very wide. Wood's operation performed antiseptically. Left hospital in 27 days, apparently cured.

Summary of cases.

Comment.—These cases represent seventeen distinct operations on thirteen subjects and fourteen herniae, the operations being repeated in the case of three persons on account of recurrence. To these must be added one of the cases of scrotal tumour complicated with hernia (VI. B. 1. b. xxii.), in which this operation was performed at the time of the ablation of the tumour; the patient recovered, but the hernia recurred; also an operation for strangulated hernia (v.), in which Wood's procedure was followed, with the addition that the sides of the canal were secured by catgut sutures in addition to the wire; this case also recovered, and the hernia did not descend during the patient's stay in hospital. I have thus performed nineteen operations of this kind, eight of which appeared to succeed, and eleven (including two of the repetitions) failed. The weak element in Wood's operation appears to me to

Result.

be the treatment of the sac. If the sac remains patent, the hernia must recur sooner or later, however strongly the pillars are brought together. In three cases in which I have performed the direct operation after Wood's had been done and failed, I found a patent sac (see next section, cases viii., ix., and xviii.). I think it is very probable that Professor Wood himself, with his accurate anatomical knowledge and great experience, either compresses or transfixes the neck of the sac in such manner as to cause its obliteration, but I doubt very much whether his imitators do so, and I am certain that I failed to do so myself. It is often extremely difficult to dissect the elements of the cord off the surface of the sac, and to pass a needle and wire between the two, so as to include the neck of the sac in the loop of the wire, must, I conceive, be rather a happy accident than a step that can be executed with precision and success. And even if the neck of the sac is thus included or is transfixed, I am not at all sure that this necessarily leads to occlusion; and even if it does, I suspect that a hollow is left which may initiate a fresh protrusion, or pave the way for the breaking down of adhesions if they have formed. It was in consequence of my frequent failures, and the uncertainty connected with the occlusion of the sac, that I decided to resort to the open method, which I shall presently discuss at length. These operations were performed with antiseptic precautions, and gave rise to very little disturbance, either local or constitutional. Latterly I allowed the wire to remain for longer periods than in the earlier cases, but without satisfactory result. One death took place (case xiii.) through strangulation. The patient was subject to an incessant cough, and was not a fit subject for any operation of this kind. The event does not therefore detract from the acknowledged and well-proved safety of Wood's procedure.

CHAP. XIV.

Defect of
Wood's
operation.Difficulty of
obliterating
neck of sac.Antiseptic
precautions.

Fatal case.

CHAP. XIV.

IX. 2. b.

b. ANTISEPTIC LIGATURE AND REMOVAL OF SAC.

Cases, 29; Deaths, 2.

- Incarcerated hernia.** i. European male, æt. 50. Right oblique inguinal hernia, of six years' duration, caused by a fall. Commanded by a truss, till the day before admission, when it descended and could not be got back. Was reduced in hospital after application of ice. Ring admitted three fingers. Habits intemperate; suffered from chronic bronchitis. Kept under observation for twenty days. Rupture descended on slightest provocation, and was not controlled by truss. Was anxious for radical cure. Operation performed under strict antiseptic precautions; neck of sac exposed by dissection, and tied at internal ring by catgut ligature. Pillars and sides of canal brought together by double catgut ligature; ends left long for drainage. Had strong reaction. Became delirious, and passed water involuntarily, soaking dressing; wound did well for four days, then gaped, became sloughy and putrid; diffuse suppuration spread down into the scrotum, and between the abdominal muscles. Some redness observed on right buttock. Got high fever with delirium, vomiting, diarrhoea, and great prostration. Lung symptoms observed a few days before death. Died exhausted eight days after operation. Secondary abscesses found in lungs; no peritonitis. Sac not inflamed; neck impermeable; ligature imbedded in lymph. (See Plate I.)
- Reduction.**
- Operation.**
- Pyæmia.**
- Death.**
- Recent rupture.** ii. Hindu male, æt. 30. Right oblique inguinal hernia (bubonocoele). Occurred five days ago in a street row. Painful swelling of the size of a hen's egg suddenly formed in groin; was reduced soon after. Ring dilated; distinct impulse on coughing. Cord exposed by dissection; no sac found; pillars and sides of ring united by three double catgut ligatures. Operation performed antiseptically. Wound remained sweet, and healed by first intention, in a week. Left hospital 43 days after operation; ring contracted round cord. Considerable cicatricial thickening; no impulse. Cicatrix linear; depressed in centre and adherent to cicatricial mass. (See *Indian Medical Gazette*, vol. xvi., 1881, p. 61.)
- Operation.**
- Aseptic case.**
- Successful.**
- iii. Hindu male, æt. 35. Right oblique inguinal hernia

(scrotal), of two years' duration. Painful and irreducible on admission, but went back after six hours' application of ice. Ring admitted four fingers. Operation performed with strict antiseptic precautions two days after admission. Cord exposed by dissection; neck of sac isolated, and tied with two catgut ligatures at a short distance from each other. Pillars and sides of ring brought together by two double catgut threads; ends left long for drainage. Operation succeeded by tympanitis, which lasted for a few days. Wound remained sweet till fifth day, when some putrid pus escaped on pressure. Became aseptic on the thirteenth day, after diligent antiseptic treatment. Healed mostly by first intention. Patient left hospital 31 days after operation; ring firmly contracted round cord; no impulse. Sound linear cicatrix in groin.

CHAP. XIV.
IX. 2. b.
Incarceration.
Reduction.
Operation.
Putrefaction.

iv. European (English) male, æt. 39. Right oblique inguinal hernia (scrotal), of fourteen years' duration. Rupture frequently came down in spite of truss. Ring and canal admitted three fingers. Cord exposed by dissection. Sac invaginated, and secured by loop passed through abdominal wall a little above and outside of site of internal ring; pillars and sides of canal brought together by two strong catgut ligatures; ends left long for drainage. No fever or peritoneal irritation. Wound healed by first intention. Drain came away on twelfth day; wound completely healed four days afterwards. Left hospital 91 days after operation. Ring closed, and firmly adherent to cord. Canal occupied by indurated mass. No impulse, no descent. (See *Indian Medical Gazette*, vol. xvi., 1881, p. 232.)

Invagination
of sac.

v. European male, æt. 32. Left oblique inguinal hernia of one year's duration (bubonocoele). Rupture descended on standing. Ring admitted two fingers. Cord exposed by dissection; no sac found; veins of cord varicose; tied with two catgut ligatures at an interval of one inch; pillars and sides of canal brought together by two double catgut ligatures; ends left long for drainage. No fever or peritoneal irritation. Wound healed by first intention. Catgut drain came away in ten days. Left hospital against advice, thirteen days after operation. Seen a few weeks afterwards. A hard mass bulged through the canal on coughing (epiplocele); obliged to wear a truss.

Case of
varicocele.
Recurrence of
hernia.

- CHAP. XIV. vi. Hindu male, æt. 14. Left oblique inguinal hernia (scrotal), of twelve years' duration (qy: infantile). Descended on the slightest exertion. Ring and canal very large, admitting three fingers. Cord exposed by dissection; cremaster muscle hypertrophied; neck of sac isolated; tied in two places by stout catgut thread, and divided between. Stump reduced into canal, sac left in scrotum. Wound remained sweet for two days, then became putrid and suppurated; sloughing cellulitis extended into abdominal wall and scrotum. Sac suppurated, and required free incision. Considerable constitutional disturbance accompanied these processes. Wounds finally healed soundly by granulation. Left hospital 93 days after operation with a depressed linear cicatrix in left groin. Canal closely adherent to cord; no impulse or descent. Scrotum of natural size. (See *Indian Medical Gazette*, vol. xvii., 1882, p. 51.)
- IX. 2. b. Infantile hernia. Operation.
- Putrefaction.
- Suppuration.
- Successful.
- Previous operation.
- vii. Hebrew male, æt. 50. Left oblique inguinal hernia (scrotal). Underwent operation for its radical cure twenty years ago. Remained well for four or five years, then returned. Tumour very large; canal very wide; scrotum very voluminous; truss ineffectual. Cord exposed by dissection. Sac separated from cord; neck tied with three catgut loops, and body amputated. Stump reduced into canal and pillars, &c., brought together by three double catgut threads; ends left long for drainage. Had tympanitis without fever for a few days; wound remained aseptic, and healed by first intention. Reparative process slow. Left hospital 68 days after operation with a depressed cicatrix in the groin; canal closed; no impulse or tendency to descent.
- Ligature and removal of sac.
- Aseptic.
- Successful.
- Previous operations.
- viii. Eurasian male, æt. 38. Right oblique inguinal hernia of one year's duration. Operated on twice by Wood's method (IX. 2. a. viii. ix.). Descended a third time soon after the last operation (performed on 20th June 1881). Re-admitted 21st March 1882. Sac exposed by dissection, separated from cord, invaginated, and retained in canal by catgut loop passed through abdominal wall opposite internal ring. Pillars and sides of canal brought together by double catgut sutures; ends left long for drainage. Operation performed under strict antiseptic precautions; wound remained aseptic. Had some tympanitic distension, but no fever.
- Invagination of sac.

Healed by first intention. Left hospital in 56 days; no hernial descent. Ring contracted round cord. Some impulse felt on coughing. It has been ascertained that the hernia returned after he left the hospital. Full details are given in the *Indian Medical Gazette*, vol xvi., 1881, p. 175. CHAP. XIV.
IX. 2. b.
Recurrence.

ix. European male, æt. 48, sailor. Right direct inguinal hernia of eighteen years' duration. Underwent operation by Wood's method a year ago; hernia descended after 66 days. Sac exposed by dissection, neck tied with catgut by three successive loops: body of sac removed; stump of neck placed in canal; pillars and sides of canal brought together by double catgut ligatures, ends left long for drainage. Operation performed under strict antiseptic precautions. The sac was unobliterated, somewhat contracted at neck where adhesions existed to ring. Wound remained aseptic and healed by first intention. A troublesome sinus remained in track of drain. Finally healed, with depressed cicatrix. Discharged in 118 days with a linear cicatrix. Canal closed; no impulse nor descent. Was re-admitted into hospital for sloughing dysentery, of which he died seven and a half months after the last operation. A post-mortem examination was held, and the ring found completely obliterated and firmly adherent to the cord. There was a depressed cicatrix of the peritoneum opposite the internal ring to the inside of the epigastric artery where the neck of the sac had been tied. No trace remained of the catgut ligatures. (See Plate III. and Appendix B.) Wood's operation.
Failure.
Ligature and removal of sac.
Successful result.

x. Mahomedan male, æt. 68. Right oblique inguinal hernia of sixteen years' duration. Scrotal epiplocele. Incarcerated for four days. Reduced after eighteen hours' application of ice. Same operation. Cord voluminous; veins of cord varicose. Wound putrefied, inflamed, and suppurated. Stitches removed on fifth day and tube inserted. Bagging of matter in scrotum requiring counter-opening. Wound finally healed by granulation. Discharged in 58 days with linear cicatrix in groin. Canal blocked. No impulse nor descent. Not heard of since he left hospital. Death by dysentery seven and a half months after operation.
Dissection of parts.

xi. Mahomedan male, æt. 45. Right oblique inguinal hernia of six years' duration (scrotal). Ring admitted two fingers. Large hydrocele on left side tapped; one and Incarcerated epiplocele.
Operation.
Successful.

- CHAP. XIV. a half pint of hydrocele fluid removed. Same operation.
IX. 2. b. Wound remained aseptic and healed by first intention.
Successful aseptic case. Scrotum tapped twice and sanguineous serum let out. Discharged in 30 days. Canal closed round cord. No descent nor impulse. Not heard of since.
- Incarcerated epiplocele. xii. Mahomedan male, æt. 60. Right oblique inguinal hernia (scrotal). Admitted with incarcerated epiplocele, reduced after application of ice for twenty hours. Same operation. Sac large. A thick layer of fat between neck of sac and spermatic fascia. Wound remained aseptic but inflamed and suppurated. Symptoms of carbolic acid poisoning appeared six days after operation; smoky urine, fever, delirium, dry tongue, &c. Boracic dressings substituted. Lungs became congested. Removed ten days after operation by friends. It was ascertained that he died two days afterwards.
- Death by pneumonia. xiii. East Indian male, æt. 18. Right oblique inguinal hernia of one and a half year's duration. Tumour size of a duck's egg (scrotal). Operation as in case ix. Wound remained aseptic and healed by first intention. Wire stitches removed on seventh and horsehair on tenth day. Drain came away on seventh day. Discharged in 36 days. Ring and canal closed. No impulse; cure apparently satisfactory. Not heard of since.
- Successful aseptic case. xiv. Jew, æt. 40. Right oblique inguinal hernia of six years' duration (scrotal). Ring admitted three fingers. Tumour large, descending on the slightest exertion. Same operation. Sac very large. Wound pursued aseptic course, healing by first intention. Wire stitches removed in six and horsehair in nine days. Drain came away in eight days. Serous accumulation in scrotum; removed by repeated tapping. Discharged in 48 days; canal closed round cord. No impulse nor descent; cure apparently satisfactory. Not heard of since.
- Ditto. xv. Mahomedan male, æt. 50. Right oblique inguinal hernia (encysted). Large hydrocele on right side, tapped and injected fourteen days before the operation. Usual operation. Sac double, consisting of unobliterated processus vaginalis and a diaphanous peritoneal protrusion into its cavity. Boracic lint used in dressing wound. Wound healed by first intention; no putrefaction nor inflammation.
- Double sac.

Stitches removed on eighth day and drain came away on tenth. Discharged in 37 days with a linear cicatrix adherent to the cord. No impulse or descent. Hydrocele radically cured. The case is reported at length in the *Indian Medical Gazette*, vol. xvii., 1882, p. 153. CHAP. XIV.
IX. 2. b.
Successful
aseptic case.

xvi. Hindu male, æt. 42. Right oblique inguinal hernia of five years' duration. Entero-epiplocele. Ring admitted two fingers. Usual operation. Boracic lint used in dressing. Remained aseptic and healed by first intention; stitches removed on fifth and ninth day, and drain came away on ninth day. A small membranous slough came away through track of drain. Discharged in 53 days. Depressed cicatrix in groin adherent to cord. No impulse below ring; no descent of hernia. Ditto.

xvii. European male, æt. 56. Right inguinal hernia of twelve years' duration (scrotal). Ring admitted two fingers. Constant descent of intestine, which was not prevented by a truss. Gut easily returned, but a hard lump remained in sac. Sac exposed—found to be of hour-glass shape. Lower cavity contained a mass of matted omentum adherent by bands to the interior of the sac. The omentum was ligatured in sections with catgut, the lump removed, and the rest returned. The operation was completed in the usual manner. Incarcerated
epiplocele.
Amputation of
omentum.

The wound remained aseptic and healed by first intention. Abdomen tympanitic for three days. No inflammation or fever; drain came away on tenth day. Patient left hospital 35 days after the operation with a linear cicatrix in right groin, and no tendency to reproduction of hernia. He reported four months afterwards that the parts were quite comfortable, and that there was no sign of return of the hernia. Successful.

xviii. East Indian male, æt. 45. Right oblique inguinal hernia of four years' duration. Operated on by Wood's method in 1878. Remained up for four years. Descended recently. Suffers from asthma. Usual operation. Sac bilocular, presenting two bags and an intervening septum. Wound putrefied, inflamed, and suppurated. The whole of the stump of the sac came away in the form of a slough. Pus burrowed into the scrotum and abdominal wall, requiring counter-openings and insertion of drainage tubes. Remained 209 days in hospital; numerous subcutaneous Wood's
operation.
Recurrence.
Removal of
sac.
Sloughing of
stump
Suppuration.

CHAP. XIV.

IX. 2. b.

Successful.

Successful
aseptic case.

abscesses formed on the chest and abdomen, requiring incision and drainage. Made a satisfactory recovery in the end. Hernia radically cured.

xix. Armenian male, æt. 25. Suffered from a fulness of the left groin from infancy. Pronounced symptoms of rupture were observed one and a half year ago. Ring dilated, admitted two fingers. Hydrocele on the same side. Health good. The usual operation was performed under strict antiseptic precautions. The tunica vaginalis was emptied and a portion of it removed. The wound remained sweet and healed throughout the greater part of its extent by first intention. An abscess formed in the scrotum requiring a counter-opening and drainage. He remained 78 days in hospital, and left with the wounds soundly healed, the parts contracted and consolidated, and the hernia satisfactorily cured.

Abscess of
scrotum.

Double sac.

Omental
adhesions.

Suppuration.

Successful.

Previous
operation.

Unsuccessful.

Scorbutic.

Operation.

xx. Mahomedan male, æt. 20. Left oblique inguinal hernia (scrotal) of seven years' duration. Ring admitted two fingers. Same operation. Two sacs found, a larger superiorly, and a smaller containing matted omentum adherent to the inner surface inferiorly. The adhesions were divided, the omentum returned, and the operation completed in the usual way. The upper wound healed kindly, and no abdominal symptoms occurred. Suppurative inflammation arose in the scrotum, requiring a free opening at its fundus, through which a large quantity of pus and several stringy sloughs were withdrawn. A drainage tube was inserted and the cavity gradually closed. He was discharged 55 days after the operation in good health, and without any sign of recurrence of the hernia.

xxi. European male, sailor, æt. 36. Reducible oblique inguinal hernia of the right side of seventeen years' duration. He had been operated on for its radical cure at Malta fifteen years ago. He was detained in hospital for two months, but the hernia descended four months after his discharge. The ring easily admitted two fingers. He was a robust-looking man; had suffered from scurvy, but there were no signs of it now present except some ulceration of the gums. The usual operation was performed. The tunica vaginalis was found to be distended with fluid. It was emptied and part of it removed. An opening was made

through the fundus of the scrotum and a drain placed in it. The patient had some febrile reaction, and the scrotum was found swollen, and ecchymosed on the day after operation. Next day the swelling had increased, the penis was cedematous, and it became necessary to remove the stitches, which were causing tension. On the third day the scrotum, lower abdomen, and thighs were found gangrenous, and the man was in a state of typhoid prostration. He died of exhaustion in course of the afternoon. CHAP. XIV.
IX. 2. b.

xxii. Mahomedan male, æt. 28. Oblique right inguinal hernia, of one year's duration; not entirely reducible; no strangulation; health good; subject to bronchitis. Sac exposed and opened; omental adhesions within sac. These were divided and the omentum returned. The operation was then completed in the usual manner. Slight fever and swelling of scrotum for a few days. Suffered also from an attack of diarrhœa about the third week. Wound completely healed and patient discharged in 60 days. Linear cicatrix in groin; canal closed; no impulse or tendency to recurrence. Recommended to wear a truss. Omental adhesions.
Successful.

xxiii. Jew, æt. 28. Right oblique inguinal hernia, of three years' duration, not commanded by a truss. Usual operation performed. Omentum found adherent to the neck of the sac, tied and divided and reduced. Fevered after operation. Abdomen swelled painfully; scrotum became cedematous. Wound healed by first intention, but became putrid and inflamed; suppurated and gaped. It then healed slowly by granulation; had a slight attack of diarrhœa for a week seventeen days after operation. Discharged in 55 days with wound soundly healed and canal closed. Omental adhesions.
Suppuration.
Successful.

xxiv. Englishman, æt. 18. A sailor. Right oblique inguinal hernia, of five months' duration. Had been down for twelve hours; was reduced by taxis after the application of ice. Usual operation performed. Had fever and bronchitis for a week after. Scrotum swelled, and suppuration took place in the cavity out of which the sac had been dissected. Wound healed by granulation. Discharged in twenty days; result satisfactory. Successful case.

xxv. Englishman, æt. 23. Right oblique inguinal hernia of ten months' duration. Usual operation performed. Had

CHAP. XIV.

IX. 2. b.

Successful
aseptic case.

fever for ten days. Wound inflamed and suppurated, and healed by granulation. Discharged in 40 days with a sound cicatrix and closed canal; no sign of recurrence.

xxvi. Hindu male, æt. 45. Right oblique inguinal hernia, of two months' duration. Usual operation performed; slight reactive fever. Wound remained aseptic and healed mostly by first intention. Discharged in 37 days; result very satisfactory.

Ditto.

xxvii. Bhootea male, æt. 24. Right oblique inguinal hernia, of sixteen years' standing. Usual operation performed; opening made in scrotum, and tube inserted; no constitutional disturbance. Wound healed in twelve days. Discharged in 36 days; linear cicatrix; canal closed; no impulse. Provided with a truss.

Tetanus.

xxviii. Mahomedan male, æt. 25. Right oblique inguinal hernia, of three years' duration. Painful and irreducible on admission. Ice applied and tumour reduced by taxis. Suffered from fever and abdominal pain for 25 days. The usual operation for radical cure was then performed. Wound healed by first intention in ten days; symptoms of tetanus appeared eleven days after operation; was removed against advice and remonstrance by his friends three days afterwards with the disease fully developed.

Successful
aseptic case.

xxix. Mahomedan male, æt. 35. Right oblique inguinal hernia, of one year's duration. Rupture irreducible for an hour before admission; symptoms of strangulation; reduced by taxis after application of ice. Usual operation for radical cure performed four days after. Wound healed by first intention. Discharged in 29 days. Result very satisfactory.

Varieties of
the direct
operation.

Comment.—These 29 cases are examples of what is known as the direct operation for the radical cure of hernia. In the last edition of Erichsen's "Science and Art of Surgery," five varieties of the direct operation are enumerated—namely, "(1) Closing the ring by sutures without touching the sac; (2) ligature of the neck of the sac; (3) suture of ring with invagination of sac; (4) ligature of the sac with excision of the portion below the ligature; (5) ligature of the neck of the sac, excision of the part below the ligature, and suture of

the ring." The great majority of the cases belong to the fifth category, but a few will be found to belong to the second and third. I began to practise this operation in the year 1881. As early as 1871, Professor Lister had dealt successfully with the sac directly; and in 1876 I saw in his clinique a case of immense scrotal hernia, in which he had successfully amputated the sac, stitched the edges of it, and brought the pillars together. The result was recovery and cure of the hernia. It was in view of these cases, and with a conviction of the great power which the antiseptic method conferred in dealing with the peritoneum, that I elaborated this operation, proceeding step by step until I arrived at the full persuasion that, in cases in which it was considered desirable or necessary to operate for the radical cure of hernia, nothing short of its extirpation, by exposing and isolating the sac, ligaturing its neck, removing its fundus, and bringing the sides of the canal together, offered a satisfactory ground of hope of effectual remedy. I afterwards found that I had been anticipated by Professor Annandale of Edinburgh, who, in the *Edinburgh Medical Journal* for December 1880, described an operation identical with that which I had been performing, and cited ten examples of it. The operation has also been extensively practised in England and America, and on the continent of Europe, especially by Marcy, Banks, Rushton Parker, Wood, Israelsohn, Czerny, Tilanus, Le Championnière. It has, in fact, become a recognised and very general proceeding, and since my return to England I have seen several excellent instances of its performance by Macnamara at the Westminster Hospital and elsewhere. A comparison of the passages relating to the radical cure of hernia in the third and fourth editions of Bryant's "Surgery" (1879 and 1884), gives interesting evidence of the change which has been wrought in the surgical mind regarding this matter during the interval

CHAP. XIV.

Lister's cases.

Annandale's experience.

Other operators.

200 CIRCUMSTANCES JUSTIFYING OPERATION.

CHAP. XIV.

Cases in which
operation is
justifiable.

which has elapsed between their issue, I am very far from holding that this or any other operation should be resorted to in all cases of hernia; on the contrary, when a reducible hernia is under command of a truss, and when a patient understands the use of it and the importance of habitually wearing it, and can afford or manage to supply himself with an efficient one, I should "let well alone." The cases in which I have performed the operation belong to several classes—namely, (1) those in which recent danger to life occurred through incarceration or strangulation, and the likelihood of a recurrence of the danger from the patient's character or circumstances existed; (2) those in which, from any cause, descent took place easily or habitually in spite of wearing a truss; (3) those in which adherent omentum remained habitually in the sac, and formed a guide for repeated descent; (4) congenital herniæ in adults; (5) cases in which the patient was incapacitated for particular descriptions of labour, and urgently solicited operation; (6) all cases of scrotal tumour complicated with hernia, in which, on other grounds, operation seemed advisable; and (7) all cases of strangulated hernia as an addition to the incisions required for its relief. All the cases in which I have performed the operation fall under one or other of these categories. I have, for convenience of reference, brought together in tabular form all the cases in which, up to the time of leaving India, I performed this operation. They fall under three classes:—

Classification
of cases.

Classes.	Number of operations.	Number of deaths.	Percentage of deaths.
A. Cases of strangulated hernia	14	5	35·7
B. Cases of scrotal tumour complicated with hernia ...	7	4	55·5
C. Cases of irreducible hernia...	33	4	12·1

The mortality among cases of class A is high, but the deaths were due to causes unconnected with the opera-

tion. Cases of class B show a still higher death-rate, and a comparison with the statistics given in Chapter X. proves that this operation adds a very material risk of death to operations for scrotal elephantiasis; so much so, that it seems more than doubtful whether the operations should be performed simultaneously. I have included among the deaths in class C two cases which were removed in a moribund state. The subsequent death of one was positively ascertained, and the death of the other, though not reported, is extremely probable. The mortality (12·1) is very high; but with better selection of cases and more stringent antiseptic precautions, the rate is undoubtedly capable of great reduction. Whether the operation will ever become a perfectly safe and deathless one in India is doubtful. Tetanus, which attacked and no doubt killed case xxviii., in the course of a satisfactory convalescence, is, as I shall show in a subsequent chapter, exceedingly apt to supervene in operations connected with the scrotum and testes, and we are absolutely ignorant of any means of anticipating or preventing this dire disease. The other three fatalities occurred in persons of damaged constitution: the causes of death were pyæmia, spreading gangrene, and congestion of the lung. In no case did death arise from any peritoneal mischief or abdominal complication, and the symptoms of these were in all cases conspicuous by their absence, even when the wound putrefied and suppurated, or when, as in case xviii., the stump of the sac sloughed and was discharged with the pus.

The operation was in all cases performed under strict antiseptic precautions; but putrefaction invaded the wound in six out of these 33 cases, and suppuration occurred in the scrotal sac in a few others. In the great majority the wound pursued an aseptic course, and the case gave occasion for no anxiety. The steps of the operation, as performed in most of the cases, are described in detail in the following extract from a

CHAP. XIV.

Causes of death.

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clinical lecture which I published in the *Indian Medical Gazette* for September 1882 :—

Question of
reducing the
rupture before
operating.

"It is not a matter of much importance whether the hernia has been returned into the abdominal cavity or not before the operation. In this respect it differs from almost every other operation performed for the radical cure of hernia. In these it is necessary that the hernia should be returned into the abdominal cavity before the operation is commenced; and in all cases of operation by invagination, or in which invagination

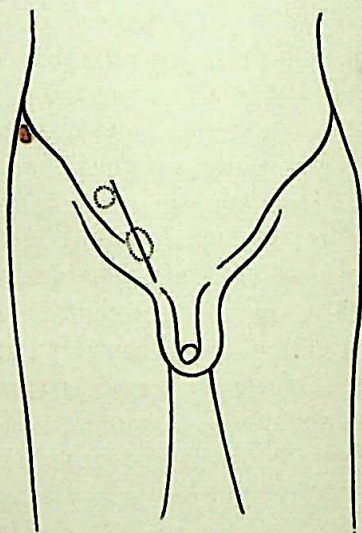


FIG. 4.

forms a part of the procedure, it is absolutely indispensable that the contents of the hernial sac should be reduced before operation. In this operation the presence of the contents in the hernial sac rather facilitates matters than otherwise; that is to say, it enables us to identify the sac better than when it is empty. I am in the habit, however, of returning the hernia when reducible before commencing to operate. In the accompanying outline are represented the hips and genital organs, the position of the external or superficial ring, and that

of the internal or deep ring. The guide to the position of the external incision is the superficial ring which can be identified by depressing the skin of the groin. The upper margin of the external ring is taken as the centre of the incision, and the incision is carried as far below as above this central point. Its direction should correspond with the direction of the cord, and it ought to fall short by half or three-quarters of an inch of the root of the penis, and not exceed three inches in total length. The external incision is made not for the purpose of invagination, but for reaching the neck of the sac, and reaching it in the most direct manner; this operation being a direct operation, in which every step is watched by the eye, as contrasted with others in which the steps of the operation are concealed from view, the less perfect sense of touch being the only available guide. This incision involves the skin and both layers of subcutaneous fascia of the groin down to the aponeurosis of the external oblique, which ought to be exposed and identified thoroughly. This may be done by one deep incision or by pinching up and transfixing the skin and fasciæ, or by a series of incisions, which latter course is safer. In exposing the aponeurosis of the external oblique, you are pretty certain to wound two arteries, branches of the femoral—the superficial epigastric and the superficial external pudic; the former is divided above the external ring, the other at the lower angle of the wound. These must be secured by ligatures placed both on their proximal and distal orifices, and they are generally the only vessels which require tying during the whole operation. The exposure of the aponeurosis of the external oblique enables you to identify and uncover the intercolumar fascia. The object is to reach the sac for the purpose of dissecting it out. It becomes necessary therefore to divide all the coverings of the cord; these may be divided one by one, and the upper margin or edge of the superficial ring is the point from which the division

Arteries wounded.

CHAP. XIV.
Exposing the
sac.

commences, the division being carried down as far as the limits of the external wound. First divide the intercolumnar fascia. Pinch the fascia up with two pairs of dissecting forceps, make a small incision into it between them, insert a director in the direction of the cord, and slit the fascia on the director. The cremasteric fascia then comes into view, and is recognised by the bundles and loops of muscular fibres it contains. This is dealt with similarly. Now the spermatic fascia is laid bare, and here lies the real difficulty of the operation. It is necessary to separate it from the surface of the sac, because the fascia derives its vascular supply from the surrounding tissues, and if it is dissected out along with the sac, considerable oozing of blood results, and division of some vessels which would require ligature. Besides, the object is not to remove the fasciæ or the coverings of the cord, which would tend to weaken the canal, but to remove the sac itself. It is sometimes difficult to separate the spermatic fascia from the sac, more particularly at the neck where adhesions between the two very often exist. The cellular interval between the cremasteric and spermatic fasciæ being a loose one, it is very easy to make the mistake of dissecting out this fascia along with the sac. By a little careful dissection, however, you generally reach a thin layer of fat, which is the sub-peritoneal fat, and which separates the spermatic fascia from the surface of the sac. In some subjects this layer of fat is considerable. The vessels of the sac will be found to be distributed on it in a reticular manner, whereas the vessels of the fascia seem to enter it from the immediate neighbourhood, and do not pervade it in a reticular manner. You will also be able to see the contents of the sac through it, if it be not thickened, whereas the fascia is opaque. In some cases where the sac is loosely attached to its coverings, the dissection is easy; the sac may be separated and pulled out by means of the finger or the handle of a scalpel with

an occasional touch of the knife or scissors. Accurate CHAP. XIV.
 isolation of the sac is an art acquired by experience in Dissection of
 operating. It is very rarely that one gets an oppor- the sac.
 tunity in a dead subject of dissecting a hernial sac ;
 this can only be learned in a living subject in the
 performance of the operation. I have found that the
 safest and best plan is to isolate the neck of the sac in
 the first instance, and by rolling the cord and the sac,
 which lies in front of it, between the finger and
 thumb, you can ascertain which is cord and which the
 sac. You will also be able by the same manœuvre to
 fold the sac on itself and perceive its edge. Having
 identified the edge of the sac, a few light touches with
 a knife will enable you to dissect it off from the sur-
 face of the cord. Having isolated the neck, the removal
 of the fundus of the sac from the scrotum is an easy
 matter. You may at this time put a provisional liga-
 ture upon the neck of the sac, and if there be any
 difficulty in dissecting the body of the sac from the cord,
 you may lay it open, and keep your finger within the Opening the
 sac, to know that you are taking the sac and nothing sac.
 but the sac. In incarcerated hernia it is necessary to
 open the sac and unravel its contents, undo adhesions,
 and perhaps remove portions of omentum. In cases of
 strangulated hernia it may be necessary to open the
 sac for the purpose of inspecting the contents and for
 unfolding twisted and looped intestines, and perhaps
 for cutting off pieces of strangulated omentum. In all
 cases where it is necessary to open the sac, precautions
 should be taken to prevent entrance of air or other
 material into the peritoneal cavity, and this is best
 done by directing an assistant to hold a sponge firmly
 over the inguinal canal. The operation is of course
 performed under spray, and at this point the efficiency
 of the spray is a matter of great moment. It is well
 to irrigate the wound now and again with strong
 (1 in 20) carbolic lotion. In separating the body of
 the sac from the cord it often happens that the testis

CHAP. XIV.

The scrotal
cavity.

is pulled into the wound. If the sac is large it descends into the scrotum, and if adhesions exist the testis is pulled upwards. It is not isolated in most cases except in cases of congenital hernia. It still remains attached to the interior of the scrotum by the coverings of the cord, which have only been opened in front, and which remain on every other aspect adherent to the scrotal coverings. A cavity remains, however, in the scrotum out of which the sac has been pulled or dissected out, and this cavity is apt to be filled with blood or with sero-sanguineous fluid, or in cases where inflammation arises, with pus, or, where putrefaction sets in, with putrid material. This scrotal cavity is therefore an important feature in the operation. Now the neck of the sac must be dissected and separated from its surroundings up to the level of the internal ring. This is done by careful separation by the finger and cautious division of any adhesion by means of a blunt-pointed scissors. Very often fibrous bands are found proceeding from the posterior aspect of the sac to the posterior surface of the canal: these require division. Anteriorly and laterally the connections between the sac and the coverings of the spermatic fascia are looser, and can be disrupted by the finger. The sac may be pulled down with a considerable amount of firmness, and this pulling down ensures complete separation of the neck from its surroundings. The fact that you have reached the neck of the sac is ascertained by your being able to pass the finger easily and completely behind the conjoined tendon and the edge of the internal oblique and transversalis and all round the canal at that level. In most cases a slight separation is made between the peritoneum and the transversalis fascia beyond and around the internal ring. Care must, however, be taken not to injure the peritoneum and not to push the finger through it or cut it with the scissors. Now the neck of the sac is to be tied, and for that purpose a thick catgut thread is taken. An assistant holds the sac on

the stretch, the thread is then placed on the neck of the sac, which is pulled firmly down as far as possible, and a reef-knot is placed upon the sac so drawn downwards with a considerable degree of tightness. It must not be so tight as to strangle the sac, neither so loose as to incur the risk of slipping. The same ligature is taken and knotted on the opposite side of the sac at a lower level than the first; another knot is made at a little lower level still on the same aspect as the first: then a fourth one on the other side of the cord and with four succeeding loops the neck of the sac is

CHAP. XIV..

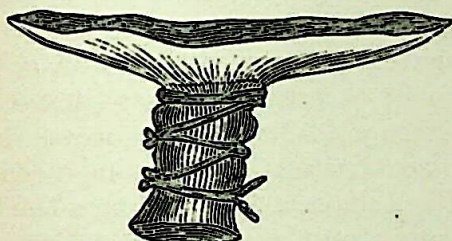
Ligature of
the neck of
the sac.

FIG. 5.

securely tied and a stump or plug results from the tying. The last loop must be tightened a little more firmly than the others, in order to prevent all possibility of slipping. Then the sac is entirely cut off, and you are now able to see that nothing but the sac is included in the noose. Having ligatured the neck of the sac, it is replaced in the canal behind the conjoined tendon, and is made to lie in an oblique position so as to correspond to the internal ring and inguinal canal. The next step is to bring the tendinous boundaries of the canal in close contact, which is accomplished by means of a strong four-ply catgut ligature. By a little dissection the conjoined tendon and the internal pillar are brought into view internally, and Poupart's ligament and the external pillar externally. The former are transfixed by a Wood's hernia needle, which is threaded with a double thread, and thus carries four

Amputation of
the sac.Suturing the
pillars.

CHAP. XIV.

Counter-
opening.

plies of catgut back into the canal. The position of the cord is now carefully realized, and the needle carrying the catgut is passed through Poupart's ligament and the external pillar from within. The thread having been pulled and cut, the needle is withdrawn, and this four-ply ligature is now tied tightly. If the canal and the superficial ring have been widely dilated, it may be necessary to place two such sutures at different levels. The ends of these sutures are left long for the purpose of draining the wound cavity. In performing this part of the operation it is advisable to be very careful regarding the cord. The cord has been denuded of its coverings, and very little pressure on it might abolish its circulation and lead to gangrene of the testicle, as occurred in two of my cases. The perforation of the pillars and the boundaries of the canal must not therefore be made too close to the pubic spine, and the sutures must be tightly drawn together so as to prevent pressure on the cord by the catgut loop. The conjoined tendon and the internal pillar ought to be perforated about half-way between the spine of the pubis and the top of the superficial ring, and Poupart's ligament and the external pillar at a point opposite this; that is, the threads should traverse the centre of the external opening. If the scrotal cavity is large, provision for free drainage should be made. This may be done by inserting a tube or a leash of catgut threads. A small wound may be made at the fundus of the scrotum to facilitate drainage, if the cavity is large and deep. The wound in the groin is now brought together by two wire sutures of relaxation, and as many horsehair stitches of adaptation as may be necessary, the end of the drains emerging between the stitches. The wound is dressed antiseptically. The dressings are changed after 24 hours, then every third or fourth day, and subsequently according to the amount of discharge. In favourable cases no inflammation takes place. There is an effu-

sion of sanguineous serum during the first twenty-four or forty-eight hours. Then the wound is filled with plastic lymph, which undergoes organization. Considerable induration occurs in the neighbourhood of the wound, and union by first intention takes place. The stitches are generally removed in a week. The ends of the drains come away in about ten days, and the wound in favourable cases entirely heals up in about a fortnight. We have observed that in some cases tympanitis may occur for the first two or three days, but this is of no importance. In one or two cases I had to relieve the bladder, and in some cases a little tenderness has been complained of in the neighbourhood of the wound, but in no case had there been any sign of general peritonitis, and in no aseptic case has there been any constitutional disturbance of consequence, except in the case of the old man in whom symptoms of carbolic acid poisoning were developed. When repair has been completed there is a linear cicatrix in the groin, the centre of which is generally depressed and adherent to a mass of cicatricial tissue which fills the canal and binds its tendinous margins close. The superficial ring is closely adherent to the cord, which is tightly enveloped and fixed by the cicatricial material I have described. This often forms a substantial mass above Poupart's ligament, and the impulse on coughing is generally less distinctly felt in the inguinal region of the side operated on than on the other side. I have had several opportunities of dissecting cases in which this operation had been performed, after a lapse of five to twelve days, and, in one case, seven and a half months, and have found the process of consolidation and adhesion to be in very efficient and satisfactory progress.

Period
occupied by
repair.

Tympanitis.

Retention.

Final result.

Dissection of
fatal cases.

"Such being the steps of the operation, let us consider what the principles are on which it is founded. They are adapted from those on which the operation of Professor Wood rests.

CHAP. XIV.

Principles of the operation.

"Professor Wood enumerates five circumstances connected with his operation which, he argues, contribute to the success of it. ('On Rupture,' chap. x.)

Valve-action of the conjoined tendon.

"First, *The approximation of the posterior and superior boundaries of the canal to the anterior and inferior.* Wood has shown conclusively that the canal is guarded by a valve-like arrangement, that as a canal it is weak, and that direct protrusion of the abdominal contents might easily take place were it not for the valve-like arrangement which exists. The principal element in the valve-like arrangement is the conjoined tendon which forms the posterior and superior boundary of the canal. This valve is pulled outwards and downwards in every muscular act which tends to cause protrusion of the contents of the abdominal cavity, and it is the inefficiency of this valve which gives rise to hernia. It is the restoration of the conjoined tendon to efficiency as a valve which constitutes the originality and merit of Professor Wood's operation. In the operation I have described I imitate Wood's operation in approximating the conjoined tendon and the internal pillar to Poupart's ligament and the external pillar. But the approximation is performed by means of a material which does not cut. Professor Wood uses wires, and there is a tendency in these to cut, and in the tissues held by them to relapse into their former condition. I have found by dissection that the catgut does not give way, whereas the wire is a source of irritation, and often causes suppuration and destruction of structures which we wish to remain intact. The catgut retains the parts in approximation long enough to enable them to adhere. The threads themselves undergo cell infiltration and organization, and add to the bulk of the new material and strength of the valvular material which fills up the cavity.

Advantage of catgut.

"The *second* advantage that Professor Wood claims for his operation is that it *produces consolidation of the tendinous structures and contraction by the irritation of*

the wire. In cases where suppuration takes place I suspect that the operation loses more by the suppuration than it gains by the surrounding inflammation. In this operation there is as a rule no suppuration, and the catgut used for the approximation is itself capable of infiltration and organization, so that the bond of adhesion resulting from the use of catgut is likely to be more firm than the temporary lodgment of the wire used by Professor Wood.

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Advantage of
avoiding
suppuration.

"Third, *It obliterates the sac.* Unless the sac is obliterated, hernia invariably returns. This is fully recognized by Professor Wood, but it is in this respect that his operation is least effective. Does obliteration of the sac of itself cure hernia? No. A great variety of operations have been performed whose object has been to obliterate the sac. In some old operations the sac was cut off, castration being at the same time performed; in some others it was ligatured or compressed at the neck, with or without the spermatic cord. More recently the sac has been injected with cantharides or iodine, or had setons or foreign bodies inserted into it; and still more recently it has been exposed, ligatured at the superficial ring, and cut off. But in all these sac operations, which without antiseptics have been found dangerous to life, unless the sac is tied at the level of the internal ring, and means are taken to bring the boundaries of the canal together, the operation will fail. If the sac is tied at the external ring, a bubonocoele is apt to occur, as Professor Wood has shown, which results in hernia. Professor Wood's operation does obliterate the sac if done well, and he evidently knows best how to accomplish this part of it. Other surgeons are timid, or wanting in anatomical knowledge or special skill, and always try to invaginate the sac. Professor Wood grasps the cord and passes his needles through or behind the neck of the sac. The wire traverses or compresses it, and perhaps subsequently cuts it. But, as compared with this operation, the great

Necessity of
obliterating
the sac.

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difference is, that here we make it perfectly certain that the sac is obliterated as far as the internal ring ; and this I conceive to be the principal merit of the operation I perform. In Wood's operation the sac may be obliterated half-way between the external and internal ring, but there is no certainty where it is obliterated, or whether it is obliterated at all. In two cases in which Wood's operation had been performed and the hernia had returned I found the sac unobliterated. Wood's operation has an element of failure, inasmuch as the obliteration of the sac is not a matter of certainty. In this operation there is no doubt whatever about the fact or place of obliteration.

Futility of
invagination.

"Fourth, *The invaginated scrotal tissues (fasciæ) form a sort of plug in the canal and on the surface of the cord, which strengthens the induration and adhesion, which is procured by transfixing and approximating the tendinous boundaries of the canal.* Wood's operation is partly an invaginating operation. He does not imitate old operations by distending the canal with plugs, but still he invaginates and plugs by invagination, and claims this as one of the advantages of his operation. He invaginates all the coverings of the cord and sac, and sometimes the sac itself, and these structures are retained in the canal by transfixion by the wires. The very fact of these tissues being invaginated tends to prevent adhesion of the walls of the canal. Between the tendinous structures which it is desired to approximate and weld together intervene at least eight distinct layers of fascia, whose tendency through gravitation and other causes is to fall out. Can we therefore be surprised at a canal restored to its original patency and a sac to its original volume after temporary invagination ? Here there is no invagination ; the tendinous boundaries are brought into immediate contact after all the fasciæ have been divided and the sac removed, and there is a plug consisting of the stump of the sac which occupies the upper aperture of the canal behind

Plugging
from within.

the conjoined tendon. This plug resembles a cork, which the forces that tend to produce a rupture drive into the canal from within, whereas Professor Wood's cork enters from without and below, and these forces tend to extrude it. CHAP. XIV.

"Fifth, *It brings the pillars in contact and narrows the superficial ring.* In this respect the direct operation must, from the considerations I have adduced, be more effective and permanent. Approximation of pillars.

"To sum up, the advantages which the direct operation I have described appears to me to present, as compared with Professor Wood's, are:—

"1. The operation is performed directly; and all the tissues and structures involved are brought under examination by the eye. In Wood's operation the finger ought to be very intelligent to avoid mishap, for cases have happened where surgeons have perforated the bowel with the hernia needle. In this operation precision and safety are more easily secured. Summary of advantages.

"2. The boundaries of the canal are brought together directly, without any intervening material and by means of catgut—an agent which itself undergoes organization and contributes to the strength of the valve-like boundaries of the canal.

"3. There is no invagination from below, which is apt to fall out from the canal subsequently, but there is a plug provided by the stump of the sac, which occupies the canal and strengthens it internally, and has no disposition to be removed from its interior.

"4. The sac is completely obliterated at the level of the internal ring.

"5. The external wound is situated in the abdominal wall and not in the scrotal wall, which renders the antiseptic management of the case more easy, and obviates the great risk of septic suppuration in a very awkward and dangerous situation."

This extract presents clearly the views which I have been led to entertain regarding this operation. The

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Subsequent
use of a truss
advisable.

Question of
recurrence of
hernia.

Dr. Raye's
experience.

question remains, Does it radically cure the rupture? There can be no question whatever that the existing hernia is removed, and that recurrence of it is rendered physically impossible. But the part cannot be considered a sound one. Originally weak, it has been rendered more so by the disease, and further lamed by the operation. The formation of a new hernia is therefore not an impossible or even improbable event. I have seen this happen in two instances; but in view of the considerations just mentioned, I am always in the habit of advising patients to wear a truss for some time after the operation, more particularly when undergoing unusual exertion. Wearing a light truss in order to prevent the formation of a rupture is, however, a very different thing from wearing a truss to prevent the descent of an existing hernia into a patent sac. I have not been able to trace many of my patients after leaving hospital. When they were discharged, a perfect cure had been to all appearance accomplished in every instance, and in four cases I was enabled to satisfy myself that the benefit conferred had been maintained for many months after discharge. In one of these cases I had an opportunity of dissecting the parts. The result will be found detailed at length in Appendix B, and the appearance presented by the parts before and after dissection is faithfully depicted in Plate III.

It is remarkable that, of 69 cases of all kinds in which the side is indicated, 54 herniæ were on the right, fourteen on the left, and one double. In the *Indian Medical Gazette* for August 1883, my colleague, Dr. D. O'C. Raye, has published a table of sixteen cases—eight of strangulated and eight of reducible hernia—in fourteen of which he tied and dissected out the sac, and subsequently brought the pillars together with catgut. The results were satisfactory. Only one death took place from gangrenous cellulitis among the sixteen operations.

Tabular View of Operations performed for the Radical Cure of Hernia.

A.—CASES OF STRANGULATED HERNIA.

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
1	M.	27	Right oblique inguinal entero-epiplocele; congenital. Right testis situated in external ring lying in front of hernial sac.	Hernia descended suddenly 4 days ago; complete obstruction of bowels since descent. Vomiting set in 3 days after descent. Painful irreducible swelling in right groin. Ice, purgatives, and enemata used without effect. Symptoms of strangulation supervened; fecal vomiting, hiccough, cold sweats, tympanitis, frequent small pulse, &c. Serous sanguineous fluid removed by tapping.	Performed 3 days after admission, 7 after descent. Sac cut down on and opened; contained matted and congested omentum adherent to surface of testis. Knuckle of strangulated gut above. Omentum ligatured with catgut in 3 portions, and cut off. Stump and intestine reduced. Sac stitched with catgut; pillars and sides of canal with silver wire; wound sutured with wire and horse-hair. Performed antiseptically.	Vomiting ceased at once. Bowels were moved within 24 hours. Constitutional disorder abated rapidly; wound suppurated and healed by granulation. Abscesses formed in epigastrium and left buttock, which were opened antiseptically and healed quickly. Inguinal wound remained aseptic throughout.	Discharged in 62 days with sound cicatrix in right groin. Canal plugged with cicatricial tissue, testis fixed opposite ring; no hernial impulse on coughing. Resumed occupation as servant, and has remained quite free of rupture. Seen repeatedly since he left hospital.

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A.—CASES OF STRANGULATED HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
2	M.	58	Right oblique inguinal entero-epiplocele of 7 months' duration.	Irreducible for 58 hours before admission. About the size of the fetal head, tense and painful. Bowels obstructed. Ice applied and taxis tried with and without chloroform with no effect. Vomiting, restlessness, and signs of collapse set in.	Performed 15 hours after admission. Sac opened, contained congested omentum and intestine. For-mer ligatured with catgut in 3 sections and cut off; latter reduced. Sac dissected off cord; neck tied with 3 loops of catgut and reduced within canal; body of sac cut off. Pillars and conjoined tendon brought together with strong catgut threads, ends left long for drainage. Wound stitched with iron wire and catgut. Operation performed antiseptically.	Never rallied. Pulse became weaker and extremities cold. Vomiting, restlessness, and clammy perspiration continued.	Sank 8 hours after operation. Died of collapse.
3	M.	30	Right oblique inguinal entero-epiplocele of 10 years' duration.	Came down about an hour before admission; size of a large cocoonut; bowels obstructed. Taxis tried in vain with and without	Sac exposed by oblique incision over outer ring. Stricture found in inter-columnar fascia; on its division contents easily reduced. Sac invaginated in canal, retained by cat-	Patient very restless and delirious on the night after operation; pulled off dressing and exposed wound. Bloody motion followed by a similar one next day. Scrotum swelled, and on	Discharged in 57 days. Scrotum of natural size. Depressed cicatrix in right groin. Considerable mass of indurated cicatri-

			<p>chloroform. Ice applied for 5 hours without effect. Symptoms of strangulation set in; vomiting, feeble pulse, clammy sweats, &c.</p>	<p>gut loop passed through abdominal wall opposite inner ring and tied over a roll of boracic gauze. Pillars and sides of canal brought together by 3 double catgut sutures, ends left long for drainage. Skin wound stitched with catgut. Operation performed under strict antiseptic precautions.</p>	<p>4th day discharge profuse, purulent and putrid. Counter-opening made. A large membranous slough (the sac) eventually came through the opening. Suppuration extended along cord. No peritonitis. Wound granulated and contracted after extrusion of slough. Restored to sweetness by iodine injections.</p>	<p>cial material around cord. No hernial impulse nor sign of descent. Not heard of since.</p>	
4	M.	40	<p>Right inguinal oblique hernia (scrotal epiplocele), 4 years' duration.</p>	<p>Descended 4 days previous to admission. Taxis tried in vain, with and without chloroform, before and after admission. Suffered from vomiting and obstruction of bowels and increasing local tenderness. Pulse regular, good strength; surface warm; tongue furled, moist; general health good. Tumour tense, painful, dull on percussion and fluctuating.</p>	<p>Oblique incision in right groin, coverings divided seriatim; sac opened. Sanguineous serum gushed out and strangulated omentum presented. Lateral pulled down till healthy structure came into view. Tied with 4 catgut ligatures at line of demarcation, and strangulated portion amputated. Sac dissected out, tied at neck and removed. Stump reduced into canal and retained, and sides of canal brought together by two four-ply catgut sutures; ends left long for drainage.</p>	<p>Temperature never exceeded 100°, and became normal in 4 days. Vomiting subsided. Bowels became regular in 15 days. Required two doses of castor-oil before then; wound remained aseptic; discharge gradually became lymph and scanty. Drain came away in 12 days, wire stitches removed in 8, and horse-hair in 11 days. Wound healed in 15 days.</p>	<p>Remained 48 days in hospital. Centre of cicatrix depressed, adherent to an indurated mass occupying canal. Superficial ring firmly adherent to cord. No impulse nor descent. Hydrocele tapped and injected successfully before he left hospital. Not heard of since.</p>

A.—CASES OF STRANGULATED HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
				Hydrocele fluid, withdrawn from lower part by a fine trochar, and sanguineous serum from upper.	age. Operation performed under strict antiseptic precautions.		
5	M.	35	Oblique inguinal hernia (right), of 7 years' duration.	Came down 6 hours before admission; vomited thrice; swelling tense and painful; taxis with ice and chloroform applied without avail; 1 oz. of sanguineous fluid withdrawn by fine cannula. Very anxious and restless; perspiring freely. Bowels obstructed.	Performed 12 hours after descent. Sac laid open; congested, contained a coil of congested small intestine and very fat mesentery. Gut emptied and reduced. Sac dissected out and tied at neck; pillars, &c., ligatured in the usual way. Operation performed antiseptically.	Obstruction continued, with dry retching and free perspiration. Abdomen became tympanitic and thoracic viscera were congested. In 4½ days the operation of laparotomy was performed; sent of obstruction found; gut liberated and intestine punctured.	Died in 10 hours after second operation—5½ days after the first. Recent peritonitis and paralysis of intestines. Herniotomy wound aseptic and in process of satisfactory repair.
6	M.	40	Right oblique inguinal hernia of 5 years' duration.	Descended 6 hours before admission; happy and easy; no return of fluid re-	Sac laid open. Knuckle of small intestine found acutely inflamed, bent at an acute angle; limbs of	Wound remained aseptic for a week; then putrefied and suppurated and gaped; matter formed in canal.	Remained in hospital 66 days. Decompressed cicatrix in right groin. Canal

<p>Admitted May 27, 1882.</p>	<p>moved; ice applied; reduced after 6 hours. Came down again after a fortnight. Partly reduced after tapping. Symptoms of prostration. Cold sweat, feeble pulse, &c.</p>	<p>Healed slowly by granulation. Constitutional symptoms gradually improved under treatment. Bowels became regular; strength and flesh returned.</p>	<p>and outer ring firmly adherent to cord. No descent or impulse; abdominal wall lax; discharged with a truss as a precaution. Seen April 4, 1883, perfectly well; no reappearance of hernia.</p>
<p>7</p>	<p>M. 32</p>	<p>Pursued aseptic course. Dressings changed after 1, 3, 4, 3, and 3 days; wire stitches removed in 8 days and horse-hair in 11. Drain came away in 14. Healed by first intention. No inflammation.</p>	<p>Discharged 25 days after operation; parts consolidated; no sign of descent. Linear cicatrix in groin; ring closed; no impulse.</p>
<p>angle glued to each other and to mesentery. It was stretched, lymph peeled off, and reduced. Sac and canal dealt with as in case 4. Operation done antiseptically.</p>	<p>Sac exposed. External ring nicked; contents partly reduced; sac laid open; full of omentum adherent by a band to bottom of sac; band tied and divided; omentum returned. Sac dissected off, tied at neck and removed; testes and cord pulled out of scrotum, returned after trimming and stitched to fundus of scrotum. Sides of canal brought together as usual; drainage tube passed from wound through incision in fundus of scrotum.</p>	<p>Healed slowly by granulation. Constitutional symptoms gradually improved under treatment. Bowels became regular; strength and flesh returned.</p>	<p>Discharged 25 days after operation; parts consolidated; no sign of descent. Linear cicatrix in groin; ring closed; no impulse.</p>
<p>Came down 12 hours before admission; irreducible. Patient restless; vomited thrice after admission. Bowels acted after enema. Ice and taxis applied without avail; 7 ozs. of clear fluid removed by canula.</p>	<p>Congenital hernia, right side.</p>	<p>Healed slowly by granulation. Constitutional symptoms gradually improved under treatment. Bowels became regular; strength and flesh returned.</p>	<p>Discharged 25 days after operation; parts consolidated; no sign of descent. Linear cicatrix in groin; ring closed; no impulse.</p>

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A.—CASES OF STRANGULATED HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
8	M.	45	Left oblique inguinal hernia (scrotal).	Down 48 hours; very tense and tender; a small quantity of sanguineous serum removed by tapping; very restless and anxious. Ice applied for 5 hours, and taxis tried without effect.	Sac exposed and opened; contained congested intestine and a knuckle of large intestine; both reduced. Several bands of adhesion between omentum, and interior of sac divided; sac dissected out, ligatured at neck, and removed. Pillars, &c., brought together with catgut.	Suffered from shock, which was succeeded by prostration. Abdomen became tympanitic; hicough set in; got stercoraceous vomiting; temperature abnormal.	Died of exhaustion 5 days after operation. On dissection the intestine which had been herniated was found to be gangrenous. Septic peritonitis had occurred; omentum had retained its vitality.
9	M.	40	Right oblique inguinal hernia (scrotal).	Disease of long duration. Came down 12 hours before admission. Ice and taxis applied; tumour partially reduced. Symptoms of strangulation became more urgent notwithstanding.	Operation 18 hours after descent. Sac exposed and opened; contained a knuckle of congested and ecchymosed small intestine and some omentum. Stricture in neck of sac divided, contents reduced. Sac dissected out, tied at neck and amputated. Pillars, &c., sutured with catgut. Operation performed antiseptically.	Wound healed by first intention; tympanitis subsided. Slight fever on 3rd, 4th, and 5th days. Suffered from looseness of bowels.	Symptoms of tetanus appeared on 4th day. The disease rapidly assumed a severe type, and carried him off next day, 10 days after the operation.

10	M.	55	Right oblique inguinal (scrotal).	Five years' duration; 6 days down. Symptoms of strangulation extremely severe. Stercoraceous vomiting and collapse.	Sac exposed and opened. Contained 10 ozs. of sanguineous fluid and 3 inches of deeply congested small intestine; enlarged mesenteric gland prevented reduction. Stricture in neck of sac divided. Contents returned and operation completed as in last case.	Several loose stools passed after operation. Abdomen continued puffed and tender. Vomited frequently.	Did not rally, and sank 4 days after operation. Post-mortem examination not permitted.
11	M.	60	Double oblique inguinal hernia (scrotal), with double hydrocele.	20 years' duration. Both hernia descended 6 days ago, and right found strangulated. Symptoms of strangulation well marked. Left irreducible.	Right sac exposed and opened. Contained 6 inches of inflamed small intestine and a quantity of sanguineous serum. Contents reduced, and operation completed as in last case. Left could not be reduced.	Operation followed by high fever, sloughing cellulitis, and peritonitis. Symptoms subsided in 14 days. Left hernia reduced on 18th day.	Remained 49 days in hospital. Right hernia cured. Left commanded by a truss.
12	M.	60	Left oblique inguinal (scrotal).	15 years' duration. Down 15 hours. Symptoms of strangulation well marked. Ice and taxis tried without effect.	Sac exposed and opened. Contained matted omentum and bowel; former adherent to inside of sac. Adhesion separated, and operation completed as usual.	Wound remained aseptic and healed by first intention.	Discharged in 26 days with the canal firmly closed.

A.—CASES OF STRANGULATED HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
13	M.	55	Right oblique inguinal (scro-tal).	25 years' duration; operated on without success 20 years ago. Strangulated 4 hours. Taxis failed, and patient very prostrate. Large hydrocele on right side tapped without effect.	Sac exposed antiseptically and opened. Two coils of intensely congested small intestine, some omentum, and appendix vermiformis down; coils adherent to one another; contents returned. Sac ligatured at neck and amputated. Pillars sutured as usual.	Wound remained aseptic. Bowels moved by laxative after 4 days. Healed by first intention.	Recovered in 34 days. Cure apparently radical. (See <i>Indian Med. Gaz.</i> for April 1884.)
14	M.	60	Right oblique inguinal hernia (congenital scro-tal).	Existed since boyhood; testicle small. Strangulation existed for 24 hours. Ice and taxis tried without success.	Sac exposed and opened. Contained knuckle of very congested small intestine. Coils glued by recent excitation. Adhesions separated. Right testicle removed. Sac ligatured at neck and amputated. Pillars brought together in the usual way.	Wound became putrid on 3rd day, and sloughing cellulitis of groin and abdominal wall ensued, requiring very free incision. Constitutional disturbance very severe (typhoid state).	Dangerous symptoms subsided a fortnight after operation. Sloughs separated and wound granulated, and eventually cicatrized. Recovered in a month and a half. No reappearance of hernia. Firm closure of canal. (See <i>Indian Medical Gazette</i> for April 1884.)

15	M.	30	Right oblique inguinal hernia of 5 years' duration.	Large scrotal tumour and double hydrocele of 12 years' duration; spleen much enlarged, and liver slightly so. Consumes 12 grains of opium daily.	Scrotal tumour removed. Hydroceles emptied. Redundant tunica pared off. Sac dealt with as in No. 4. Flaps cut from thighs to cover testes, which were stitched in place with catgut. Operation done antiseptically.	Suffered from shock and smart reaction. Symptoms of septicaemia appeared on 6th day; wound sloughy, putrid. Unhealthy action extended; bed-sores formed; no peritonitis.	Died of septicaemia in 12 days after operation. Result of the operation for hernia satisfactory.
16	M.	45	Right oblique hernia of 5 years' duration.	Large scrotal tumour and double hydrocele of 7 years' duration.	As in last case. Spermatic artery accidentally wounded; castration performed on right side. Sac and canal dealt with as in case 4.	Some suppuration took place around stump of cord, requiring insertion of a tube. Otherwise the wound pursued a satisfactory course, and cicatrized in 67 days.	Ring obliterated and canal occupied by a plug; no impulse nor tendency to fresh descent.
17	M.	45	Right oblique inguinal hernia of 15 days' duration.	Large hydrocele on right side, and elephantoid thickening of scrotum. Hernia irreducible for 5 hours. Returned after application of ice.	Scrotal tumour removed. Tunica dissected off and cut away. Sac tied at neck and amputated as in case 4. Pillars and sides of canal stitched. Loop pressed on cord, causing strangulation of testicle, which was removed next day.	Wound suppurated and abscesses formed in both groins over cords. They were opened and healed kindly. Pus burrowed on right side, causing sinuses, which had to be laid open, and took some time to heal.	Puckered cicatrix in each groin. Right depressed. Considerable induration beneath. No hernial impulse. Scrotum healed soundly. Discharged in 42 days.

B.—CASES OF SCROTAL TUMOUR COMPLICATED WITH HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
18	M.	38	Left oblique inguinal hernia of 2 years' duration.	Large hydrocele on left side, and scrotal tumour; hernia reducible. Rather a feeble, prematurely aged man.	As in case 15. Performed under strict antiseptic precautions. Cord voluminous.	Wound remained sweet for 4 days, then putrefied. Discharge fetid for 10 days. Wound became clean, aseptic, and began to granulate. 20 days after operation it got flabby; the tongue got dry, and symptoms of septic infection appeared.	Died 24 days after operation, of septicaemia. No peritonitis nor pyemic lesions.
19	M.	60	Right inguinal hernia.	Elephantiasis of penis and scrotum of 12 years' duration.	Tumour removed as usual. Sac dissected out and dealt with as usual.	Operation succeeded by high fever. Wound became gangrenous.	Died of prostration from septicaemia 7 days after operation. No peritonitis. Gangrenous cellulitis had spread up the cord. Large white clots in right cavities of heart.
20	M.	33	Right oblique inguinal hernia of 4 years' duration. Had	Scrotal tumour of 3 years' duration; truss of no use.	Scrotum removed. Sac dissected out, ligature slipped and intestines protruded; they were returned	Wound remained aseptic and repair was proceeding satisfactory, when—	Totanus set in on 7th day, and proved fatal in 18 hours.

been operated on 3 years ago. Descended in a month.		Hematocoele dis- charging fetid fluid through a small orifice.	and the sac more securely ligatured. Right testicle removed.	Scrotum removed; hae- matocele pared off. Sac dissected out, ligatured at neck and amputated. Pil- lars, &c., brought together as usual.	High fever and sloughing of wound. Fever gradu- ally subsided and sloughs separated.	Absconded in 55 days after opera- tion. Wound superfi- cial and nearly healed. No descent of hernia. Canal well closed.
21	M. 38	Right oblique scrotal hernia, with haemato- cele of right side.				
22	M. 38	Right oblique inguinal hernia (scrotal).	Operated on by Wood's method on May 15 and June 30, 1880. Rupture descended after each operation. Ad- mitted March 4, 1881. Hernia scro- tal.	On March 30, 1881. Sac exposed by oblique inci- sion in groin, invaginated and retained in canal by catgut loop passed through abdominal wall and tied over roll of boracic gauze. Pillars and sides of canal brought together by strong catgut suture.	Slight fever and tympan- itic distension after opera- tion. Wound healed by first intention. Drain came away on 10th and 12th day; loop on 18th.	Discharged in 53 days. Outer ring closed. No descent of hernia. Abdo- minal wall lax and yielding above and outside of canal. [Heard that rup- ture had subse- quently returned.]
23	M. 39	Right oblique inguinal hernia	Not commanded thoroughly by truss.	Same operation as in case 22. Two sutures used to	No fever nor peritonéal irritation. Wound healed	Left hospital 91 days after operation.

C.—CASES OF REDUCIBLE HERNIA.

C.—CASES OF REDUCIBLE HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
			of 14 years' duration. (scrotal).	Ring and canal admitted 2 fingers.	approximate pillars. Strict antiseptic precautions.	by first intention. Catgut drains came away 11 days after operation, and wound healed entirely 4 days afterwards.	Ring closed, firmly adherent to cord. Canal blocked; no impulse nor descent. Not heard of since.
24	M.	30	Right oblique inguinal hernia of 5 days' duration (bubonocoele).	Rupture occurred in a street squabble; ring considerably dilated; hydrocele on same side.	Hydrocele tapped and cord exposed by dissection. No sac found. Pillars, &c., brought together by 3 double catgut sutures.	Wound healed by first intention. No local nor constitutional disturbance.	Left hospital in 43 days. Ring firmly contracted around cord. Cicatrix depressed. No impulse. Not heard of since.
25	M.	32	Left oblique inguinal hernia of 1 year's duration (bubonocoele).	Hernial tumour descended on standing. Ring admitted 2 fingers.	Cord exposed by dissection; no sac found. Veins of cord varicose, tied with 2 catgut ligatures at the distance of an inch. Pillars, &c., brought together by 2 double catgut sutures, ends left long for drainage.	No fever or peritoneal irritation. Wound healed by first intention. Drain came away in 10 days.	Discharged in 12 days. No impulse nor descent. Seen afterwards; a hard mass (epiplocele) bulged through canal on coughing. Varicocoele cured.

26	M.	50	Light oblique inguinal hernia of 6 years' duration (scrotal).	Became strangulated a month before operation. Reduced after application of ice. Ring admitted 3 fingers. Rupture protruded on standing or coughing; truss ineffective. Habits intemperate. Chronic bronchitis.	Neck of sac exposed by direct dissection, isolated and tied. Pillars, &c., brought together by two double catgut sutures. Sac left in scrotum. Strict antiseptic precautions.	Strong reaction; delirious; passed urine involuntarily; soaked dressings. Wound putrefied, suppurated and gaped; diffuse suppurum extended into scrotum and abdominal wall. Erysipelatous redness on buttock. Fever, diarrhoea, vomiting and prostration.	Died 18 days after operation, of pyæmia. Multiple abscesses in lungs; neck of sac impermeable. No peritonitis. Large sloughy sinus in abdominal wall. Sac contracted, not inflamed.
27	M.	35	Right oblique inguinal hernia of 2 years' duration (scrotal).	Admitted with painful irreducible hernia and symptoms of prostration. Reduced after 6 hours' application of ice.	Two days after reduction. Neck of sac isolated as in case 26, and tied with 2 catgut ligatures. Pillars, &c., approximated by 2 double sutures.	Tympanitis for a few days. Wound putrefied on 5th day, became aseptice on 12th, and healed by secondary adhesion.	Discharged in 31 days; canal firmly adherent to cord. Linear cicatrix in groin. No impulse. Not heard of since.
28	M.	14	Left oblique inguinal hernia of 12 years' duration (scrotal).	Rupture descended on standing; ring admitted 3 fingers.	Neck of sac exposed; ligatured in two places, and divided between. Sac left in scrotum; ligatured neck laid in canal. Pillars, &c., brought together by 2 double catgut sutures.	Wound putrefied and suppurated. Sloughing cellulitis extended up and down, requiring counter-openings. Sac suppurated and was laid open. Wound finally healed by granulation; had considerable constitutional disturbance.	Discharged in 93 days. Wounds quite healed. Depressed cicatrix in groin. Canal closely adherent around cord. No impulse or descent. Scrotum of normal size. Not heard of since.

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C.—CASES OF REDUCIBLE HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
29	M.	50	Left oblique inguinal hernia of 20 years' duration (scrotal).	Underwent operation 20 years ago; remained well for 4 or 5 years. Ring and canal very large; truss inefficient; scrotum lax and testes pendulous. Feeble old man.	Sac exposed by dissection, neck tied, and body removed; stump of neck placed in canal. Pillars, &c., brought together by 3 double catgut sutures, ends left long for drainage.	Had tympanitis without fever for a few days. Wound remained aseptic and healed by first intention. Process of repair very feeble and effusion of lymph slight.	Discharged in 68 days. Canal closed. No recurrence of hernia. Seen 4 months after discharge. A large hernial tumour had formed on the same side.
30	M.	18	Right oblique inguinal hernia of 1½ year's duration.	Tumour size of a duck's egg. Scrotal.	Operation as in case 29.	Wound remained aseptic and healed by first intention. Wire stitches removed on 7th and horse-hair on 10th day. Drain came away on 7th day.	Discharged in 36 days. Ring and canal closed. No impulse; cure apparently satisfactory. Not heard of since.
31	M.	48	Right direct inguinal hernia of 18 years' duration.	Underwent operation by Wood's method a year ago. Hernia descended after 66 days.	Same operation. Sac unobliterated. Somewhat contracted at neck where adhesions existed to ring.	Wound remained aseptic and healed by first intention. A troublesome sinus remained in track of drain. Finally healed with depressed cicatrix.	Discharged in 112 days. Linear cicatrix. Canal closed; no impulse nor descent. Seen repeatedly since; parts remain firm; no tendency to recur; healed.

32	M.	40	Right oblique inguinal hernia, of 6 years' duration (scrotal).	Ring admitted 3 fingers. Tumour large, descending on the slightest exertion.	Same operation. Sac very large.	Wound pursued aseptic course, healing by first intention. Wire stitches removed in 6 and horse-hair in 9 days. Drain came away in 8 days. Serous accumulation in scrotum; removed by repeated tapping.	Discharged in 48 days. Canal closed round cord. No impulse nor descent. Cure apparently satisfactory. Not heard of since.
33	M.	45	Right oblique inguinal hernia of 6 years' duration (scrotal).	Ring admitted 2 fingers. Large hydrocele on left side tapped; 1½ pint of hydrocele fluid removed.	Same operation.	Wound remained aseptic and healed by first intention. Scrotum tapped twice and sanguineous serum let out.	Discharged in 30 days. Canal closed round cord. No descent nor impulse. Not heard of since.
34	M.	60	Right oblique inguinal hernia (scrotal).	Admitted with incarcerated epiplocele, reduced after application of ice for 20 hours.	Same operation. Sac large. A thick layer of fat between neck of sac and spermatic fascia.	Wound remained aseptic, but inflamed and suppurated. Symptoms of carbolic acid poisoning appeared 6 days after operation; smoky urine, fever, delirium, dry tongue, &c. Boracic dressings substituted. Lungs became congested.	Removed 10 days after operation by friends. It was ascertained that he died 2 days afterwards.

C.—CASES OF REDUCIBLE HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
35	M.	68	Right oblique inguinal hernia of 16 years' duration (scrotal epiplocele).	Incarcerated for 4 days. Reduced after 18 hours' application of ice.	Usual operation. Cord voluminous; veins of cord varicose.	Wound putrefied, inflamed and suppured. Stitches removed on 5th day, and tube inserted. Begging of matter in scrotum requiring counter-opening. Wound finally healed by granulation.	Discharged in 58 days with linear cicatrix in groin. Canal blocked. No impulse or descent. Not heard of since he left hospital.
36	M.	50	Right oblique inguinal hernia (encysted).	Large hydrocele on right side, tapped and injected 14 days before the operation.	Usual operation. Sac double, consisting of unobliterated processus vaginalis and a diaphanous peritoneal protrusion into its cavity. Boracic lint used in dressing wound.	Wound healed by first intention. No putrefaction nor inflammation. Stitches removed on 8th day and drain came away on 10th.	Discharged 37 days after operation. Linear cicatrix. No impulse or descent. Hydrocele cured.
37	M.	42	Right oblique inguinal hernia of 5 years' duration.	Entero-epiplocele. Ring admitted 2 fingers.	Usual operation. Boracic lint used in dressing.	Remained aseptic and healed by first intention; stitches removed on 5th and 9th days, and drain came away on 9th day. A small membranous slough came away through track of drain.	Discharged in 53 days. Depressed cicatrix adherent to cord. No impulse or descent.

38	M.	47	Right oblique inguinal hernia of 4 years' duration.	Operated on by Wood's method in 1878. Remained up for 4 years. Descended recently. Suffers from asthma.	Usual operation. Sac bilocular, presenting 2 bags and an intervening septum.	Wound putrefied, inflamed and suppurated. The whole of the stump of the sac came away in the form of a slough. Pus burrowed into the scrotum and abdominal wall, requiring counter-openings and insertion of drainage tubes.	Remained in hospital 209 days after operation. Hernia radically cured.
39	M.	56	Right inguinal hernia. of 12 years' duration (scrotal).	Ring admits 2 fingers. Truss ineffective. Constant descent of gut, which is easily returned, but a hard lump remains in the sac.	Sac exposed; of an hour-glass shape. Lower cavity contained matted adherent omentum, which was removed after ligature in sections. Omentum returned, and operation completed as usual.	Wound remained aseptic and healed by first intention. Tympanitis for 3 days. No inflammation or fever. Drain came away on 10th day.	Remained 35 days in hospital. Left with a sound linear cicatrix in right groin, and no hernial impulse or descent. Reported 4 months afterwards that he was quite comfortable and well.
40	M.	25	Left oblique inguinal hernia (scrotal) of 14 years' duration.	Ring admitted 2 fingers. Hydrocele on the same side.	Usual operation. The tunica vaginalis emptied and a portion of it removed through the wound in the groin.	The wound remained sweet, and healed by first intention. An abscess formed in the scrotum, requiring counter-opening and drainage.	Discharged in 78 days. Wounds soundly healed. Parts contracted and consolidated. Hernia cured. Seen afterwards; no return.

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XIV.

C.—CASES OF REDUCIBLE HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
41	M.	20	Left oblique inguinal hernia (scrotal) of 7 years' duration.	Ring admitted 2 fingers. Sac could not be entirely emptied.	Same operation. Double sac. Inferior and smaller contained adherent matted omentum, which was removed after ligature with catgut.	No abdominal symptoms. Upper wound healed kindly. Abscess formed in scrotum, requiring free opening and drainage.	Discharged in 55 days. Wounds soundly healed. No sign of hernia.
42	M.	36	Right oblique inguinal hernia of 17 years' duration.	Operated on at Malta 15 years ago. Hernia recurred in 4 months. Ring admits 2 fingers. Had suffered from scurvy.	Same operation. Hydrocele. Tunica emptied and partially removed through wound. Opening made for drain in fundus of scrotum.	Fever next day. Scrotum swollen and ecchymosed. Swelling increased next day. Stitches removed. Gangrene of scrotum and thighs on 3rd day.	Died 3 days after operation, of spreading traumatic gangrene.
43	M.	28	Oblique right inguinal hernia (scrotal) of 1 year's duration.	Not entirely reducible. Subject to bronchitis.	Sac exposed and opened. Omental adhesions — divided. Operation completed as usual.	Slight fever and swelling of scrotum for a few days. Diarrhea in third week.	Recovered in 60 days. Canal blocked. No impulse.
44	M.	28	Right oblique inguinal hernia	Not commanded by truss.	Sac exposed and opened. Omental adhesion to neck	Fever, tympanitis, and swollen scrotum. Wound	Discharged in 55 days. Wound sound.

		(scrotal) of years' duration.		of sac, divided. operation.	Usual	
45	M.	18	Right oblique inguinal hernia (scrotal) of 5 months' duration.	Irreducible on admission. Returned by taxis after prolonged application of ice.	Usual operation.	became putrid, suppurated, gaped, and healed by granulation. Discharged in 20 days. Wound healed. Hernia apparently cured.
46	M.	25	Right oblique inguinal hernia (scrotal) of 10 months' duration.	Not commanded satisfactorily by truss.	Usual operation.	Discharged in 40 days. Sound cicatrix. Canal well closed.
47	M.	45	Right oblique inguinal hernia (scrotal) of 2 months' duration.		Usual operation.	Discharged in 37 days. Hernia apparently cured.
48	M.	24	Right oblique inguinal hernia (scrotal) of 16 years' standing.		Usual operation.	Discharged in 36 days. No impulse.

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XIV.

C.—CASES OF REDUCIBLE HERNIA—(continued).

No.	Sex.	Age.	Description of Hernia.	Condition on admission.	Operation.	Progress.	Result.
49	M.	25	Right oblique inguinal hernia (scrotal) of 3 years' duration.	Irreducible on admission. Reduced by taxis after application of ice. Fever and abdominal pain for 25 days.	Usual operation performed 25 days after admission.	Wound remained aseptic and healed by first intention in 10 days.	Tetanus set in 11 days after operation. Removed by friends, against advice, 3 days after.
50	M.	35	Right oblique inguinal hernia (scrotal) of 1 year's duration.	Symptoms of strangulation on admission. Rupture reduced by taxis after application of ice.	Usual operation 4 days after admission.	Wound remained aseptic and healed by first intention.	Discharged in 29 days. Result satisfactory.
51	M.	23	Left oblique inguinal hernia (scrotal).	Irreducible for 1½ hour before admission. Marked symptoms of strangulation. Reduced by taxis under chloroform.	Usual operation for radical cure 3 days after admission. Counter-opening made for drainage at fundus of scrotum.	Wound remained aseptic and healed mostly by first intention.	Discharged in 58 days. Canal firmly closed and no impulse or tendency to descent.
52	M.	45	Right oblique inguinal hernia	Reducible. Do-seconds on the slight-	Usual operation performed under strict anti-	Wound suppurated and healed by granulation.	Discharged in 46 days. Canal firmly

		(scrotal) of 4 years' duration.	est Ring admits 2 fin- gers.	septic precautions. De- pendent opening made in the fundus of the scrotum, and a tube introduced.		closed. No ten- dency to reproduc- tion of hernia.
53	M.	18	Right oblique inguinal hernia (scrotal) of 1 year's duration.	Reducible; do- scends on walking, running, or strain- ing.	Usual operation. Counter- opening made in scrotum and drainage tube in- serted.	Wound united by first intention in 10 days.
						Discharged in 27 days. Canal obli- terated. No im- pulse; cure appa- rently complete.
54	M.	49	Right oblique inguinal hernia of 15 days' du- ration.	Irreducible, but not strangulated.	Usual operation. Omen- tum adherent to floor of sac, ligatured, divided and reduced. Opening for drainage made at fundus of scrotum.	Wound united by first intention in 11 days.
						Discharged in 29 days. Result satis- factory. Seen re- peatedly 5 months after operation. No reappearance of the rupture.

CHAPTER XV.

INCISIONS.

Cases, 36 ; Deaths, 16.

THESE operations are so varied in their nature and cause, and have so little in common, that they do not admit of being profitably discussed in mass. I shall, therefore, add a few observations to each series of cases which admits of useful remarks, leaving the subject of abscess to be treated of in a separate chapter.

IX. 3.

3. TRACHEOTOMY.

Cases 16 ; Deaths 7.

- | | |
|------------------------|--|
| Diphtheria. | i. English sailor, æt. 25. Diphtheria. Died in seventeen hours. (Dr. Palmer.) |
| Laryngitis. | ii. Hindu male, æt. 26. Laryngitis of four days' duration. Recovered. Discharged in 91 days. (Dr. Palmer.) |
| Ditto. | iii. Hindu female, æt. 28. Laryngitis and œdema glottidis of five days' duration. Recovered. Discharged in 35 days. |
| Diphtheria. | iv. Hindu female child, æt. 13 months. Diphtheria of four days' duration. Operation rendered necessary by extreme dyspnœa. Died next day. |
| œdema glottidis. | v. Hindu male, æt. 65. œdema glottidis. Respiration ceased during operation, and had to be re-established by Howard's direct method. Recovered. Discharged in 28 days. |
| Ditto. | vi. Hindu male, æt. 35. œdema glottidis five days; great dyspnœa. Died of pneumonia in two days. |
| Sloughing sore throat. | vii. Hindu male, æt. 25. Sloughing sore throat. Great dyspnœa. Died of acute bronchitis in one day. |
| Laryngitis. | viii. Hindu male, æt. 45. Laryngitis of three and a half months' duration; history of syphilis. Admitted with great |

dyspnœa, relieved by aconite, blisters, &c. Imminent suffocation 21 days after admission necessitated laryngo-tracheotomy. He survived the operation 29 days, and died of septicæmia and pneumonia. The thyroid cartilage underwent necrosis and lay in a gangrenous cavity.

ix. Mahomedan male, æt. 35. Symptoms of dyspnœa of Aortic ten days' duration, very urgent on admission; history of aneurism. syphilis. Tracheotomy performed at once below the isthmus. Died of dyspnœa four days after operation. An aneurism of the arch of the aorta was found after death.

x.-xiv. Hindu male, æt. 35. Laryngitis with œdema Laryngitis. glottidis of two days' duration. Dyspnœa extreme; relieved at once by opening the windpipe. Left hospital quite recovered of both disease and wound in 35 days.

In the remaining four cases tracheotomy was performed as a preliminary to operations in the mouth Preliminary tracheotomy. and pharynx. (See VI. A. 2. c. i.; VI. A. 3. c. i.; VI. A. 3. d. iii., and X. 4. ii.) In each of these cases great comfort and safety were secured by diverting the respiratory current from its usual route.

xv. Hindu female. æt. 28. Had been admitted about Laryngitis. four months previously into the second surgeon's ward for acute laryngitis. Tracheotomy was found necessary on account of urgent dyspnœa. After two months' detention in hospital she was discharged apparently well; she remained well for a month, when the laryngeal symptoms recurred with an attack of fever; the difficulty of breathing again becoming alarming, she sought readmission into hospital, when it was found necessary to repeat the operation (at the former site) and reintroduce a tube. This gave complete relief. She remained 137 days in hospital; the glottis continued so thickened and contracted that she could not breathe comfortably without the tube. She was subjected to various plans of treatment. Her general health was good, and becoming impatient of detention, she was provided with a tube and allowed to leave hospital. She has not been heard of since.

xvi. Eurasian child, æt. two and a half years. Diphtheria. Diphtheria. Disease of five days' duration; difficulty of breathing

CHAP. XV. extreme. Trachæa opened below the isthmus of the thy-
 IX. 3. 4. roid, and tube inserted. Breathing relieved, but patient died
 of exhaustion in sixteen hours.

Tracheotomy was also performed in case VI. B. 13. *a. supra*. Result, death, which was not due to the operation.

Circumstances
 necessitating
 operation.

Comment.—The windpipe was opened in seventeen cases included in these records. In four of these the measure was adopted as a preliminary to severe operations in the mouth and pharynx, and great comfort was gained to both patient and operator thereby, without materially adding to the risk. In a fifth case tracheotomy was resorted to in a case of chloroform asphyxia, without benefit. Of the remaining twelve, three were operations for asphyxia in an advanced stage of diphtheria. Death took place in each case soon after, and the relief was only temporary. Six were performed for acute laryngitis and œdema glottidis. One case died of pneumonia in two days, and in another case a tube had to be worn permanently. The remaining four cases did well. Three operations were performed for sloughing sore-throat, syphilitic disease of the larynx, and dyspnoea caused by aneurism of the arch of the aorta. All these patients died. The results of these operations are not, on the whole, very brilliant. Operation was facilitated in four cases, and life saved in other four. Some relief was given in most of the remainder. Tracheotomy must always have a high death-rate in Calcutta, on account of the desperate circumstances often necessitating it, and the delay in resorting to it. Fayrer details eleven cases, with two recoveries, which were imperfect, inasmuch as the patients were obliged to wear a tube. The death-rates shown in Appendix A are also very high.

Results.

Fayrer's cases.

4. *Exploratory Laparotomy.*—Mahomedan male, æt. 40. Admitted with a large abdominal aneurism of uncertain duration, occupying the left side of the abdomen

from the umbilicus to the erector spinæ, and from the ribs to the crest of the ileum. It was undergoing rapid enlargement and causing great distress. The abdomen was opened with antiseptic precautions, under the impression that it might have originated from dilatation of the left renal or the inferior mesenteric artery, and a ligature might be placed between the aorta and the cavity of the aneurism. On exploration by the hand it was found to spring from the abdominal aorta by a wide opening, on each side of which existed a large atheromatous plate. Large dilated arteries, branches of the inferior mesenteric, coursed over the anterior aspect of the tumour. The wound was carefully closed and dressed antiseptically. He died of exhaustion 56 hours after the operation. No sign of peritonitis was found on post-mortem examination, and the lips of the wound were glued together with lymph. The aneurism had grown from the left side of the abdominal aorta, and was filled with clot. The aorta was dilated and atheromatous throughout. Orifice of aneurism admitted three fingers. Last dorsal and two first lumbar vertebræ eroded. Lower lobe of right lung congested. Left kidney fatty.

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Laparotomy in a case of abdominal aneurism.

5. For Fistula in Ano.—i. The patient contracted erysipelas during treatment, and died of that disease. Operations for fistula in ano.

ii. iii. The fistula was laid open in the usual way in both cases, with good result.

iv. Hindu male, æt. 40. Seven years' duration. Three external and one internal opening; external piles; fistula laid open and piles removed by scissors. Left hospital quite cured in eighteen days.

v. Hebrew male, æt. 46. History of rectal trouble of one year's duration. Discharge of pus with every motion, and much pain. Hard obscurely fluctuating swelling over right ischio-rectal fossa. This was laid open, and an abscess was found which communicated with the rectum by a small aperture. An operation was performed as for fistula. Considerable hæmorrhage ensued during next twelve hours. The wound granulated kindly but slowly. Recovery delayed by formation of an abscess on under-surface of urethra. It was laid freely open, and healed rapidly. Discharged in 43 days. Ischio-rectal abscess.

vi. Hindu male, æt. 45. An indurated brawny track

CHAP. XV. extended from the rectum across each gluteal region. It

IX. 5. was riddled with sinuses starting from a strictured part of the gut about two inches from the verge of the anus. History of syphilis. All the fistulæ were freely laid open. They healed by granulation. The calibre of the rectum was restored by bougies, and patient left hospital in 171 days, cured both of fistulæ and stricture; no incontinence.

Cases of fistula
in ano.

vii. Jewess, æt. 37. Complicated with external and internal piles and fissure. Eight months' duration. Fistula divided and piles removed by scissors. Left hospital in six days in process of cure.

viii. Mahomedan male, æt. 35. Blind external fistula of two months' duration, following ischio-rectal abscess. Laid open into rectum. Wound healed by granulation. 61 days under treatment.

ix. European male, æt. 32. Complete fistula of six months' duration. Laid open in the usual way. Operation had to be repeated owing to premature union of lips of wound. Result finally satisfactory in 66 days.

x. Mahomedan male, æt. 24. Complete fistula of eight years' duration. Laid open. Discharged cured in sixteen days.

xi. Hindu male, æt. 30. Complete fistula resulting from an abscess caused by application of caustics to piles by a Madrassee quack. Fistula laid open. Pile removed after ligaturing its base. Recovered in thirteen days.

xii. Hindu male, æt. 18. Incomplete fistula with internal opening, consequent on ischio-rectal abscess bursting inside six months ago. Laid freely open. Sphincter divided; cavity very large; filled up in 50 days. Suffered from acute right pneumonia during his stay in hospital.

xiii. Mahomedan male, æt. 32. Complete fistula of eight months' duration, consequent on abscess. Laid freely open. Healed in 24 days.

xiv. East Indian female, æt. 25. Blind external fistula of seven weeks' duration. Completed and laid freely open. Healed in 23 days.

Comment.—Natives of Lower Bengal are very subject to rectal troubles of all kinds. The most serious and intractable are those originating from syphilis or

dysentery. Anal fistulæ are very frequent. The worst are those resulting from ischio-rectal abscesses, which are often met with in practice, and of which several examples are given in the next chapter. These almost always result in fistula, and my invariable practice in opening them is to divide the sphincter, and anticipate the fistula. Where the fistula is associated with piles, the abscess which precedes it is usually smaller and closer to the anus. I have seen terrible cases of diffuse suppuration around the rectum in diabetic patients. Case vi. is an example of a very aggravated double (symmetrical) fistula, apparently originating from syphilitic ulcer of the rectum; the most distant orifices being situated not far from the trochanter major. The incisions required for cure were very large.

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IX. 6. 7.

Diseases of the
rectum com-
mon in Bengal.

6. Anal Fissure.—i. ii. Divided with underlying sphincter: complete recovery in both cases. Anal fissure.

iii. A Japanese male, æt. 30. Came in for fissure of the anus, which was divided along with the sphincter without chloroform. Discharged after seventeen days, cured.

7. For Stricture of Rectum.—A European infant, æt. 12 months. Just after birth great abdominal distension was observed. After careful examination a small opening was found at the situation of the anus, with a small nodule in front of it. The opening was enlarged by incision next day, and was dilated by wax bougies. Three months afterwards the child was subjected to a second cutting operation on account of contraction of the parts. During the subsequent treatment of the case fistulous communication between the urethra and rectum was established by rough probing (as was described by the mother of the patient). On admission a small opening admitting an ordinary index finger was seen in the situation of the anus. A crescentic fold of mucous membrane was situated on the posterior wall of the canal. Urine escaped freely through the so-called anus, and fæcal matter through the urethra. The child had to strain very much during defæcation. He was put under chloroform; the anal

Congenital
stricture of the
rectum.

R

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aperture enlarged posteriorly, and then the crescentic band was divided completely. The rectum was pulled down and its edges stitched to the lips of the wound with silk ligature. Within a few days the end of the alimentary canal became adherent to the skin wound. No contraction followed, and the patient was discharged after 52 days. Circumcision was performed for congenital phimosis.

Stricture of
rectum notched
and dilated.

Comment.—This was a congenital case. Many cases of syphilitic and dysenteric stricture of the rectum were treated during the period covered by these statistics by gradual dilation by means of bougies. Notching with a guarded bistoury was in some cases resorted to.

Stricture and
extravasation.

8. *Perinæal Section.*—i. Hindu, æt. 26. Old stricture; retention for four days. Bladder distended to navel; extravasation; drowsy; urethra divided without staff, and Syme's catheter entered into bladder; died in a few hours. (Dr. Palmer.)

Stricture and
fistula.

ii. Hindu, æt. 25. History of stricture and perinæal fistula. Some urine discharged through rectum and perinæum. Catheterised before admission; several false passages; large abscess in perinæo. Cock's operation; died in five days of pyæmia. Catheter had been passed into rectum (!) before admission; perinæum and prostate riddled with false passages. The section was perfectly correct, the urethra being opened in the middle line and just in front of prostate.

Cock's
operation.
Death.

Cystitis.

iii. Mahomedan male, æt. 45. Severe symptoms of bladder inflammation; suspicion of encysted calculus. Cut; no stone found. Great relief after operation. Discharged cured in 30 days.

Stricture and
abscess.

iv. Native Christian, æt. 34. Stricture followed by perinæal abscess. Abscess opened and stricture divided by same operation. Wound healed up in a fortnight. Full-sized bougie passed occasionally. Discharged in 33 days.

Ditto.

v. Mahomedan, æt. 30. History of gonorrhœa, stricture, and perinæal abscess. No retention, but instrument could not be passed through stricture. Abscess laid open freely; instruments entered bladder a few days after. Got urethritis, ophthalmia, and synovitis of both knees; urethra gradually

dilated, and full-sized bougie passed occasionally. Left hospital in 43 days with perinæal wound closed and urethra fully dilated. CHAP. XV.
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vi. Hindu female, æt. 30. History of gonorrhœa and stricture and fistula following; abscess existed at mons veneris, through which most of the urine passed. This was consequent on catheterism for retention a month before admission. Perinæal section performed. Urethra fully dilated. Pubic fistula closed, and subsequently perinæal wound. Full-sized bougie passed occasionally. Left hospital in 53 days.

vii. Hindu male, æt. 32. Admitted 10th October. History of syphilis, gonorrhœa, stricture, abscess, and fistula. Perinæal section performed and fistulæ laid open. Subsequently two sinuses were found leading to a large abscess cavity on each side of the rectum in the ischio-rectal fossæ. Another passed forward to the left towards the pubis. These were freely laid open 35 days after the first operation. The sphincter was divided on each side. The fistulous tracts filled up and healed, with the exception of the central one, through which a little urine still escaped during micturition. The urethra admitted a No. 12 catheter, and patient's general health had greatly improved on his discharge.

viii. Hindu male, æt. 28. A boatman. Fell on a pole some days before admission and lacerated his urethra; perinæum swollen, hard, tense; penis œdematous; bladder distended. Free opening made in the middle line of the perinæum; floor of urethra found extensively destroyed; wound sloughy; patient in a state of prostration, with diarrhœa and hiccough: this lasted for about ten days. The wound cleaned and contracted, and the general condition improved. A sinus extending towards the rectum had to be slit open. The perinæal fistula remaining widely open, a plastic operation was performed 97 days after the perinæal section. Flaps were made at the sides of the opening and brought together by horse-hair stitches. This reduced the opening to a very small size. A No. 12 catheter was passed every few days, and most of the urine passed by urethra. He became impatient of treatment, and left hospital 20 days after the last operation. Laceration of urethra.
Plastic operation.

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Laceration of urethra.

ix. Hindu male, æt. 20. Ruptured his urethra two days before admission by falling on an iron rod. Blood passes from the urethra, and the perinæum is hard, tense, tender, and swollen. Free incision made in the middle line, clots cleared out, No. 10 catheter passed into bladder, and wound dressed with boracic gauze. The most of the urine at first passed through the wound, which granulated and contracted. As it contracted a larger proportion, and in 23 days the whole, passed per urethram. Left hospital 26 days after the operation.

Urinary fistula.

x. Hindu male, æt. 30. Urinary fistula in left groin, consequent on an abscess in the left inguinal region, opened one and a half month before admission; perinæum painful, swollen, and fluctuating. Incised in middle line. A large quantity of pus escaped; urethra incised to extent of three-quarters of an inch. Inguinal fistula gradually closed, and then the perinæal. A full-sized catheter was passed every third day, and he left hospital in 72 days without either stricture or fistula.

The fistula in this case was evidently due to pelvic cellulitis caused by urinary abscess forming behind the triangular ligament.

Laceration of urethra.

xi. Hindu male, æt. 30. Ruptured his urethra by falling on a bamboo from a height of six or seven feet about 22 hours before admission. A swelling formed in the perinæum and retention occurred, which was relieved by a catheter, through which bloody urine passed; this was retained for ten hours, and then the perinæum was laid open in the middle line. The urethra was found to be much torn. The perinæal wound gradually contracted, and finally healed. A full-sized catheter was passed every third day. He remained in hospital 59 days. No constitutional disturbance.

Stricture and extravasation.

xii. Hindu male, æt. 35. Had gonorrhœa five years ago. Fresh attack two months ago, succeeded by pain and difficulty in micturition. While straining to make water on the day of admission felt something give way, and perinæum and buttocks swelled. Presented symptoms of shock. Free incision made in middle line of perinæum and into left ischio-rectal fossa; pus and sloughs issued freely

from both incisions. Wound cleaned in a week. Urine passed both ways—through penis and wound—for twenty days, then through penis only. Left hospital in 46 days quite cured; a full-sized catheter was passed every third day to secure patency of urethra.

xiii. Hindu male, æt. 45. Gonorrhœa twelve years ago. Stricture and Perinæal abscess five months ago, succeeded by fistula. CHAP. XV.
IX. 8.
Had three fistulous openings in perinæum, through which urine issued. Tight stricture in the region of the bulb. Catheters 1 to 4 passed on day of admission. Nos. 3 to Operation. 6 in six days, and Nos. 5 to 8 in six days more. This Haemorrhage. operation was followed by much bleeding. The bladder became greatly distended with clots. The perinæum was laid open freely in the middle line, and No. 8 catheter introduced into the bladder through the wound; bleeding continued, and patient died ten hours after the operation, Death. of exhaustion.

xiv. Eurasian male, æt. 24. Fell on a fence which he was trying to jump, and ruptured his urethra. Passed blood per urethram. Perinæum tense and swollen; laid open freely in the middle line; a large cavity containing fluid and clotted blood found. No. 10 catheter passed into the bladder: urethra badly torn. Arterial bleeding continued, and a catgut ligature was passed round the internal pudic with a needle; wound plugged with lint steeped in tinct. fer. sesquichlor. on account of oozing. The wound granulated and closed slowly. Patient was discharged quite cured in 54 days. A full-sized catheter was passed occasionally. Laceration of urethra.

xv. Eurasian male, æt. 40. History of chancre and Perinæal abscess. gonorrhœa and perinæal abscess of five days' duration. Free opening made in middle line of perinæum. Wound healed in 23 days. Full-sized catheter passed every two or three days.

xvi. Mahomedan male, æt. 25. Fell off a coach-box, four days before admission, on to a piece of wood, which came into violent contact with his perinæum. Passed bloody urine for two days; hard, painful swelling in perinæum incised; clots removed; full-sized catheter introduced into bladder; wound gradually closed. No. 12 catheter introduced every third day. Left hospital in 32 days with the Laceration of urethra.

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IX. 8.

Stricture and
fistula.

perinæal wound fully closed, and able to make water in full stream per urethram.

Calculi in
fistula.

xvii. Hindu male, æt. 55. Scrotal fistula following abscess, through which urine dribbled. Nine months' duration. History of gonorrhœa and syphilis. Sinus slit up, and No. 12 catheter passed into bladder. A grating sensation was experienced when the instrument reached the membranous part of the urethra. Urine continuing to dribble, a grooved staff was introduced twelve days afterwards, and a free perinæal section performed. Two small calculous masses were removed from the cavity of the fistula, which was thoroughly laid open. After a few days No. 12 catheter was introduced, and this was repeated every third day. The wound contracted; but the patient got dysentery, and was taken away by his friends before the cure was complete. Remained 43 days in hospital after the second operation.

Stricture and
fistula.

xviii. Hindu male, æt. 30. Suffered from gonorrhœa ten years ago, and again six years ago. This attack was followed by orchitis and hydrocele of the left side. An abscess formed in the perinæum six months before admission. It burst and left a sinus in the fundus of the scrotum, through which urine escapes. The hydrocele was tapped about this time. Since then both penis and scrotum have undergone elephantoid enlargement, attaining the size of a cocoa-nut; penis embedded; urethra strictured. The stricture was in the first instance dilated by bougies till it admitted a No. 12. The escape of urine continuing, a grooved staff was introduced into the bladder, and the fistula thoroughly laid open and stricture divided. Several vessels had to be tied. Secondary hæmorrhage took place ten days after the operation, which was stayed by tying a bleeding point and plugging. The wound gradually contracted. A full-sized instrument was introduced every third day. He would not have the tumour removed, and left hospital 48 days after the operation.

Stricture and
abscess.

xix. Hindu male, æt. 24. Had suffered from gonorrhœa, which was followed by two abscesses, one in the hypogastric region, and another in front of the scrotum at the root of the penis. An instrument passed into the urethra entered the latter, and pus and blood welled out. A perinæal

section was performed without a guide, and a soft instrument passed into and through the penile urethra from behind forwards through the wound. This was retained for a day or two, and a drainage tube was then put in its place and retained. The abscesses were at the same time laid freely open; their cavities gradually filled up, and the resulting fistulæ closed. The tube was withdrawn, a full-sized bougie was introduced into the bladder every third day, and finally the perinæal wound also closed up. Patient left hospital in 63 days, perfectly recovered.

xx. Mahomedan male, æt. 30. Had injured his urethra by a fall seven years previously. Stricture resulted. Twenty days before admission an abscess formed in the perinæum, which burst and left a fistula, through which urine escaped during micturition. No instrument could be passed through the stricture, though repeated attempts were made. Perinæal section was performed without guide, the stricture divided, and a No. 12 catheter passed into the bladder. This was repeated periodically; the perinæal wound gradually closed, and patient left hospital after 46 days' treatment. Stricture and abscess.

xxi. Hindu male, æt. 65. Attacked with retention of urine suddenly. Urethra had been lacerated by attempts at catheterism before admission. No instrument could be passed in consequence. Cock's operation performed. Two small calculi detected in urethra, and removed by forceps. Full-sized catheter introduced into bladder per urethram. Had strong fever for two days. Full-sized metallic catheter passed on eleventh day, and every second or third day afterwards. Discharged in 31 days with perinæal wound closed, and able to make water in full stream. Retention.
Cock's operation.
Calculi.

xxii. Hindu male, æt. 36. Admitted with distended bladder, and extravasation of urine, dry tongue, and low fever. Perinæum laid freely open. Urine drawn off by Syme's catheter, which was retained. Two free incisions made in scrotum. Scrotum sloughed; maggots developed in the wound. Got diarrhœa, and sank of exhaustion seven days after operation. Extravasation of urine.
Death.

xxiii. Hindu male, æt. 34. Admitted with retention of urine, due to stricture consequent on gonorrhœa and gleet. Bladder distended. Urethra lacerated by previous Retention.

- CHAP. XV. attempts to pass a catheter. Cock's operation performed. Bladder emptied. No. 8 catheter passed into it per urethram. IX. 8. Bled a good deal after the operation and subsequently. Cock's operation. Hæmorrhage stopped by plugging. Nos. 9 to 12 catheters passed on eighth day; latter introduced every two or three days. Left hospital in 45 days, with perinæal wound healed, and able to make water in good stream.
- Stricture and fistulæ. xxiv. Hindu male, æt. 36. Admitted with organic stricture of four years' duration. Three perinæal fistulæ consequent on an abscess which burst four months ago, and an ischio-rectal abscess. No. 6 catheter was passed into the bladder. The perinæum was laid freely open on a guide, and the abscess opened fully. Had fever for three days. The urethra was fully dilated by occasional passage of instruments of increasing size. The perinæal wound and fistulæ gradually closed. Another abscess of the opposite ischio-rectal fossa had to be opened. Remained 64 days in hospital.
- Retention. xxv. East Indian male, æt. 45. Admitted with retention of 48 hours' standing, caused by organic stricture of the urethra. Relieved twice by No. 2 catheter. Urine ammoniacal. Perinæal section was performed, and the bladder thoroughly emptied. A No. 3 catheter was afterwards passed through the urethra, which was gradually dilated to its full size. The perinæal wound gradually closed, and he left hospital in 64 days, able to make water in full stream per urethram.
- Extravasation. xxvi. East Indian male, æt. 45. Admitted with several sinuses in perinæo, and retention and extravasation—the result of traumatic stricture. Perinæum laid open, and bladder emptied. Catheters of increasing size were afterwards passed into the bladder. He became impatient, and left hospital in 69 days, before the perinæal wound was fully closed. He could make water in full stream through the penis when the lips of the perinæal wound were held together.
- Stricture and fistula. xxvii. Hindu male, æt. 26. Admitted with organic stricture of six years' duration, and perinæal fistula following abscess, which formed two months ago. No. 1, 2, and 3 catheters passed with difficulty. Perinæum laid open without a guide, the stricture divided, and No. 12 catheter introduced. This was repeated occasionally. The perinæal wound healed, and patient left hospital in 54 days, able to make water in full stream through the urethra.

xxviii. Hindu male, æt. 18. Admitted with extravasa-
 tion of urine, of nine days' duration, due to rupture of the
 urethra, caused by a fall off a tree. Bladder distended, had
 been repeatedly relieved by catheter; boggy swelling in
 perinæum. Perinæum laid freely open, and No. 11 catheter
 introduced into the bladder per urethram. Urine turbid,
 ammoniacal. Deep tissues of perinæum gangrenous. Con-
 siderable bleeding followed, which was stopped by plugging.
 Patient continued to suffer from fever of typhoid type. He got
 diarrhœa, and sank of exhaustion two days after operation. Death.

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Extravasation.

Comment.—Perinæal section was performed in these
 28 cases for a variety of causes. In four cases the
 perinæum was divided for extravasation of urine.
 The conditions were such in three of the cases that
 death took place, notwithstanding very free incisions;
 in the fourth recovery resulted. In ten cases section
 was resorted to for the cure of stricture and fistulous
 openings in the perinæum. These were cases of so
 aggravated a nature that very little hope existed
 of relief by milder measures, or cases in which these
 had been tried in vain. One of these cases died of
 pyæmia, the symptoms of which existed on admission.
 A catheter had in this case been driven through the
 urethra into the rectum. The remaining nine cases
 made satisfactory recoveries. In six of them the
 operation was performed without a guide, after Cock's
 method. This is by no means a difficult matter when
 the patient is kept very steady, the finger introduced
 into the rectum, and the anterior margin of the pro-
 state identified; by transfixing the perinæum with a
 long bistoury, whose back is turned to the rectum, the
 dilated prostatic urethra is easily reached. A gush of
 urine commonly attests the fact. The wound is then
 enlarged forward, an instrument passed through it into
 the bladder. A full-sized catheter is subsequently
 introduced into the urethra, and, the stricture being
 freely divided, into the bladder. Bleeding points are
 carefully looked for and secured, and the patient put

Summary of
cases.3Cock's
operation.

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Daye's
experience.

Remarkable
cases.

Perineal
abscess.

Rupture of
urethra.

Reckless
catheterism.

to bed without tube of any kind being placed in the wound. A full-sized catheter is passed every second or third day, until all the fistulæ and the perineal wound have closed. I have found this practice successful in these very severe cases, and my colleague, Surgeon-Major D. O'C. Raye, has also been in the habit of performing the same operation in similar cases with success. (Vide *Indian Medical Gazette*, vol. xviii., 1883, p. 291.) Of course, when an instrument can be passed into the bladder, division on a guide is preferable, but in many of these cases the perineum is so riddled with false passages and sinuses, that Cock's operation, followed by division of the stricture in the manner described, is easier and surer. In case vi. the fistulous orifice was situated at the mons veneris, and in case x. at the left inguinal region. In some cases the matter had made its way into the ischio-rectal fossa. In case xvii. the urethra was quite patent, but the fistula was prevented from closing by calculi which had formed in it. In case xviii. the stricture and fistula were complicated by scrotal elephantiasis. In four cases section was performed for abscess. Recovery took place in all these, and care was taken to restore and maintain the patency of the urethra. Case xix. is remarkable in that an instrument had to be passed into the penile urethra through the wound from behind forwards. In five cases the operation was required for traumatic rupture of the urethra. A broad director was in these cases passed into the bladder through the wound after it had been cleared of clots and sloughs, and a catheter introduced on its grooved surface. All these cases made a good recovery.

In three instances section was resorted to for stricture and retention. The urethra had been badly lacerated by unskilful and reckless instrumentation, and extravasation was imminent. Cock's operation was performed, with division of the stricture and subsequent

periodical passing of full-sized instruments. These cases did well. Two cases of an exceptional kind remain. (MAP. XV. IX. 9. 10. Cystitis.

Case iii. presented severe and persistent symptoms of bladder irritation, and the presence of a stone was suspected, though it could not be discovered. An exploratory opening was made into the bladder. No stone was found, but great relief and ultimate cure resulted.

In case xiii. bleeding into the bladder followed catheterism, and perineal section was resorted to, to stay the hæmorrhage and empty the bladder. I have pursued the same practice in similar cases with success; but in this, death ensued from persistent bleeding. Hæmorrhage.

9. **Internal Urethrotomy.**—West Indian male, æt. 18. Admitted with two organic strictures—one about two inches from the external meatus, and the second in the membranous part of the urethra. Anterior stricture divided by a bistoury on a director; posterior by Civiale's urethrotome. Full-sized bougies were subsequently passed to maintain the patency of the canal. Remained under treatment for 40 days. Internal urethrotomy.

10. INCISIONS FOR HYDROCELE.

Cases, 7; Deaths, 0.

i. Mahomedan male, æt. 45. Sixteen years' duration; inflamed for four days. Laid open by free incision; turbid serum escaped; dressed with boracic gauze; healed by granulation. Discharged in 69 days. Cases of inflamed hydrocele incised.

ii. Hindu, æt. 65. One year's duration; inflamed. Laid open freely; lymphic fluid evacuated; granulated. Discharged in 29 days with linear cicatrix.

iii. Hindu, æt. 45. 25 years' duration. Injured a month before admission, causing sloughing of scrotum. Cavity of tunica laid open, clear fluid discharged; healed by granulation; discharged in 45 days with wound fully cicatrized.

iv. Hindu, æt. 30. Inflamed; scrotum cedematous; laid open freely; opaque serous fluid evacuated; healed in 43 days.

In all these cases inflammation of the sac existed, causing pain, fever, tension, cedema of scrotum, and

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sloughing in one instance. The cavity of the tunica was obliterated in each case and a radical cure obtained, the constitutional distress being at once relieved.

Hydrocele
treated by
incision and
drainage.

v. Hindu male, æt. 45. Large double hydrocele of seven years' duration. An opening was made into each with antiseptic precautions, and a drainage tube inserted. That on right side was removed after six days, but was re-inserted in 22 days owing to re-accumulation of fluid in the tunica. It was finally removed in 21 days, the cavity closing up as it was gradually shortened. The tube on the left side was retained for a month, being gradually shortened as the cavity became shallow. On both sides a radical cure was obtained. Remained in hospital 63 days.

Inflamed
hydrocele.

vi. Hindu male, æt. 40. Large hydrocele of left side, of six years' duration; became inflamed six days before admission in consequence of injury; turbid serum issued through canula. An opening was made into the tunica under antiseptic precautions, and a tube inserted. The scrotal swelling subsided at once. The tube was withdrawn in five days, the wound having apparently filled up with lymph. Two days afterwards shivering and fever took place, and fluctuation was again noticed. The tunica was laid open freely and dressed with plugs of boracic gauze. The opening healed by granulation, and a satisfactory cure was obtained in 35 days.

Ditto.

vii. East Indian male, æt. 38. Hydrocele of left side, of one year's duration, which became inflamed a week before admission. Turbid serum removed by tapping. In a fortnight re-accumulation took place, and the tunica was laid open and its cavity dressed with boracic gauze invaginated into it and plugged with carbolic gauze. It healed by granulation. A hydrocele of the right tunica was subsequently tapped and injected with iodine. Remained in hospital 66 days.

Comment.—The usual practice in the hospital for hydrocele is iodine injection, and this is carried out on a large scale in the out-door department. In these seven cases the hydrocele was inflamed, and free incision was considered preferable to either tapping or

tapping with injection. They all did well. Antiseptic precautions were adopted. Additional cases will be found in Chapter XVI., p. 277. In those immense hydroceles which are associated with scrotal hypertrophy, I am in the habit of amputating the scrotum, and removing as much of the diseased tunica as possible, treating the case subsequently as after ablation of elephantiasis. Several examples will be found in Chapter X.

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II. INCISIONS FOR HÆMATOCELE.

Cases, 18; Deaths, 2.

i. A Scotch sailor, æt. 40. Duration about fourteen years. Commenced without any apparent cause except constant labour. Put under chloroform; a portion of the right thickened tunica excised, and clots removed. Recovered, after severe constitutional disturbance, in 67 days. (Dr. Palmer.)

Cases of hæmatocele.

ii. Hindu male, æt. 41. History of injury five years ago. For one month pain had increased with fever. On incision under chloroform, a few ounces of pus let out. The cavity communicated with that of the tunica, and also extended outside it. A large mass of half-decolorized clot scooped out. Cured in 35 days.

Traumatic.

iii. An East Indian, æt. 27. Duration, according to his statement, one month. No history of injury. The tunica was laid open freely under chloroform, and was thickened to about a quarter of an inch. A portion of it excised. The edges of the wound brought together by stitches, and horse-hair used for drainage. Had severe inflammation of the part and great constitutional disturbance. Discharged perfectly cured after 64 days.

iv. Hindu male, æt. 25. Native of North-west. Commenced to grow twelve years ago. Was quiet for a long time. Had become uncomfortable for about four months. The scrotum as large as a cocoanut. The right tunica, which was thickened, was laid open freely, and clots removed. The hydrocele of the left testicle was tapped a few days afterwards, in order to relieve tension and prevent gaping. A swelling appeared which led to a suspicion of

CHAP. XV. iliac abscess. It subsided without any unpleasant symptom.
 IX. II. Was discharged cured after two months. Operation performed under chloroform.

Cases of hæmatocele. v. Native, æt. 26. Commenced seven years ago. No history of injury. Large as a cocoanut. Laid open freely; clots removed. Tunica not excised. Profuse suppuration and sloughing. Performed under chloroform.

Double. vi. Hindu, æt. 45. Double hæmatocele; of four years' duration; inflamed for five days; general health low. Both laid open simultaneously; grumous fluid and decolorized clot evacuated; healed by granulation in 72 days. General health restored.

vii. Native of Gon, æt. 28. Two years' duration; left side. Laid open freely; contained sanguineous serum and coagulated blood. Discharged well in 77 days.

viii. Hindu, æt. 34. Nine years' duration; right side; hydrocele of left. Hæmatocele laid open by free incision; contained blood; hydrocele tapped. Recovered in 67 days.

Caused by tapping. ix. Mahomedan male, æt. 50. Hæmatocele of one month's duration; consequent on unskilful tapping of a hydrocele. Incised, and drainage tube inserted in the first instance. This measure failing to empty it in three days, it was laid freely open, contents thoroughly removed, and the cavity dressed with boracic gauze invaginated, and stuffed with carbolic gauze. Healed by granulation in 38 days.

x. Hindu male, æt. 22. Putrid hæmatocele of right side. Laid open freely; washed with carbolic lotion, and dressed the same as last case; tunica about $\frac{1}{4}$ th inch thick; contained putrid grumous material. Discharge became sweet under assiduous use of antiseptics, and cavity was obliterated. Wound healed in 46 days.

Mistaken for strangulated hernia.

xi. Hindu male, æt. 35. Admitted with a very tense and painful swelling of left side of scrotum, which had been mistaken for a strangulated hernia. Constipation had existed for eight days, patient had vomited, and was in a state of prostration. On tapping the swelling, very fetid fluid of yellow colour was emitted. The cord was exposed in the groin. It was cedematous, but no sign of any hernial sac could be seen. The scrotal swelling was then laid open by free incision, and a large quantity of putrid clot and grumous liquid removed. It was dressed

for granulation. Considerable constitutional disturbance remained for a day or two, but gradually subsided: both wounds healed by granulation. An abscess formed on the right side of the scrotum, which was laid open. Eventually an excellent recovery took place in 32 days; the wounds having cicatrized, the scrotum resumed its natural size.

xii. Hindu male, æt. 24. Suffered from hydrocele of the right side, which was tapped a year ago. Re-accumulation taking place, it was again tapped four days before admission. The fluid was observed to be sanguineous, and a solution of carbolic acid was injected. Great pain and swelling and constitutional disturbance followed. On exploring the tunica, it was found to be tensely filled with bloody putrid material. It was laid open freely, and emptied, and dressed with boracic gauze. The wound gradually filled up, and patient left hospital in 48 days, with a linear cicatrix on a scrotum of normal size. He had an attack of surgical scarlatina during convalescence.

Caused by tapping and injection.

Surgical scarlatina.

xiii. Hindu male, æt. 40. Suffered from hydrocele of left tunica and periodical fever. It was tapped and injected with iodine two months before admission. This was followed by inflammation and swelling. The latter continued to increase. The tunica was freely laid open, and a large quantity of sanguineous fluid and lymphic clot evacuated. The wound healed by granulation in 55 days, the cavity of the tunica undergoing complete obliteration.

Caused by tapping and injection.

xiv. Hindu male, æt. 35. Disease said to be of one month's duration. Tunica very tense and tender, laid open freely, and dressed antiseptically; contents sanguineous serum. Wound healed by granulation in 48 days.

xv. Hindu male, æt. 26. Admitted with a tense and very tender distension of the tunica vaginalis, extending beneath Poupart's ligament into the abdomen to the level of the umbilicus. On puncture, sanguineous fluid escaped. An incision was made under antiseptic precautions, 96 oz. of fluid evacuated, and a long drainage tube inserted. Had a severe attack of fever with rigor the same day; became worse next day, and the discharge was observed to be fetid. The sac was washed out with a lotion containing iodine. Delirium and prostration ensued, and he died comatose five days later.

Abdominal hæmatocele.

Sapremia.

Death.

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IX. II.

Traumatic.

days after the operation. The sac was found gangrenous on post-mortem examination.

xvi. Mahomedan male, æt. 38. Disease of seven days' duration, caused by a kick. Tunica very tense and tender. Laid freely open; contents, sanguineous serum and small fibrinous clot. A layer of boracic gauze invaginated and stuffed with boracic lint. Wound healed by granulation in twenty days.

Fatal case.

xvii. Hindu male, æt. 20. Disease of two years' duration; tunica very hard. On tapping, turbid red fluid with liver-coloured curdy dregs issued. Laid open freely; full of coffee-ground material and dark fluid. Cavity thoroughly washed, and dressed antiseptically. Operation followed by high fever. Delirium and gangrene supervened, and death took place in two days.

Caused by
tapping and
injection.

xviii. East Indian male, æt. 27. Distended tunica of two years' duration; was tapped and injected with iodine one month ago. Laid open by a small incision, and a tube inserted. Wound healed by granulation. Was suffering from secondary syphilis, which detained him in hospital 58 days.

Prevalence and
causation.

Comment.—Hæmatocele is very common in Bengal. The disease is usually consecutive to hydrocele. In some cases there is a history of injury. Tapping is sometimes the apparent forerunner of the change from hydrocele to hæmatocele; but in a very considerable proportion of cases no history of injury of any sort can be elicited, and the change seems to be due to degeneration of the diseased tunica. In such cases, spots or patches of vascularity may be observed on the inner surface of the sac, presenting a villous or abraded aspect. It is from these that the bleeding seems to take place. The pathology of the disease seems in such cases to be as follows. The tunica becomes enormously thickened, attaining in some cases a thickness of a quarter of an inch, or even more. The inner surface of this membrane undergoes degeneration, and the cyst wall then seems to consist of two parts—an outer, white, fibrous, and tough; and an inner, yellow or

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yellowish brown and soft. This gets eroded; vessels are exposed and torn, and blood is effused into the cavity. In some cases the blood remains liquid, coagulating immediately on evacuation. In others, clotting occurs, and in time the clots break down, forming the brown curdy or coffee-ground like material which is often discovered in a hæmatocele. Inflammation may arise, and then inflammatory products get mixed up with the contents of the sac. The inflammation may proceed to suppuration, or suppuration may arise outside the sac, forming a scrotal abscess. The process of spontaneous cure appears to be, that at one or two points the degeneration pervades the whole membrane; some of the material escapes into the scrotal cellular tissue; an abscess ensues, which points and bursts; the material is partly discharged, and the cavity becomes putrid; this causes fresh irritation; sloughing of the membrane ensues, and eventually, after a long period of suffering and distress, the cavity contracts and fills up, and the sinus heals. The process of cure is in fact similar to that which is artificially and more speedily accomplished by free incision. The character of the contents of the hæmatocele depends on the stage of the disease and the presence or absence of inflammation.

Process of
spontaneous
cure.

Case VI. B. 1. b. cxxix, is a good illustration of the manner of natural cure; and the reality of the inner or degenerated layer was strikingly demonstrated by case VI. B. 1. b. cxxi., where the whole of it sloughed off as a perfect sac.

Generally this layer comes away in shreds and patches, but it can be scraped or torn off with the finger-nail or handle of the scalpel. Dr. L. A. Waddell examined, at my request, a piece of tunica which exhibited the double layer which I have described. The following is the result, and it bears out strikingly the view of the pathology of the disease which I have advanced:—

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Description of
the wall of
hæmatocele.

"The Wall of the *Hæmatocele* is found to consist mainly of a thick layer of dense fibrous tissue, the inner aspect of which is covered by a highly vascular delicate membrane, which, on being separated from the subjacent tissue, carries with it a thin stratum of the fibrous layer. Its free surface is devoid of any proper epithelial covering. This lining membrane consists of reticulated connective tissue, with an abundant admixture of elastic fibres, and several pale muscle-cells. A few somewhat round flattened cells of an epithelial character occur in detached groups. The large cells of the connective tissue are in a state of acute fatty degeneration. The intercellular substance also is infiltrated with small fat granules. This tissue is penetrated by an abundant formation of blood-vessels, the majority of which are devoid of muscular coating; and blood corpuscles, escaped from the vessels, are effused between the bundles of the connective tissue."

Treatment.

The treatment adopted in these cases consisted in free incision and evacuation of contents, with, or more frequently without, removal of part of the thickened membrane. I prefer the latter practice. Antiseptics were invariably employed. The cavity in time fills up, and the redundant tunica is removed by absorption.

Mortality.

The operation is not devoid of danger. Cases xvi. and xvii. died of acute septicæmia following gangrene of sac; and in private practice I have met with two fatal cases of tetanus due to simple incision of hæmatocele.*

12. INCISION FOR BUBO (WITH REMOVAL OF GLANDS).

Cases, 4; Deaths, 0.

Removal of
inguinal
glands.

i. Hindu, æt. 26. Had a bubo one month ago, which was opened ten days before admission. Right inguinal glands much enlarged; those of the left side slightly enlarged also. The right inguinal glands exposed by incision, and

* For a more extended discussion of the pathology and treatment of hæmatocele, with illustrative cases, see two clinical lectures by the Author, published in the *Indian Medical Gazette*, vol. xviii., 1883, pp. 297, 329.

enucleated. Wound inflamed, suppurated, and then healed slowly by granulation. Discharged in 101 days quite recovered.

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ii. Englishman, æt. 23. Sympathetic bubo of one month's duration. Glands much enlarged, and partly broken down. They were exposed by incision, and extirpated. The wound remained aseptic, and healed by granulation in 40 days.

iii. East Indian male, æt. 17. Chancroidal bubo of one month's duration. Laid freely open; gland much enlarged, and infiltrated with pus; it was enucleated. Wound healed by granulation in 24 days.

iv. East Indian male, æt. 21. Double bubo following gonorrhœa. Glands much enlarged. Both bubos laid freely open and glands extirpated at a few days' interval. Wound healed kindly by granulation in 58 days.

Comment.—In these cases the glands were in process of suppurative disintegration. When glands begin to break down from suppuration or degeneration, it saves time and prevents the formation of sinuses to scrape them out with a sharp spoon, or extirpate them. This last can easily be done by means of the fingers and director, aided perhaps by an occasional snip with the scissors.

Extirpation of
inguinal
glands.

13. INCISION FOR CARBUNCLE.

Cases, 2; Deaths, 0.

i. A European merchant, æt. 73. Had had an inflammatory swelling on the back for about twenty days, which was lanced slightly by a medical man. Large crucial incision made through the swelling; the vertical one measuring 5 or 6 inches. Recovered without any complication, and was discharged after 63 days. No sugar in his urine. Had bad health previous to this complaint.

Cases of
carbuncle.

ii. A Hindu male, æt. 48. Commenced about a fortnight ago with fever. Occupied almost the whole of the dorsal region. Freely incised under chloroform by the crucial method; this was followed by free bleeding, which had to be stopped by the application of tr. ferri. Discharged

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cured, after 44 days. There was loss of skin from sloughing. Skin grafts took very well, and hastened the cure.

Question of
incision.

Comment.—Both these cases made a rapid and satisfactory recovery under free incision. The morbid process was at once stayed, and the constitutional symptoms improved from the moment that the tension, which was great, was relieved. Carbuncles associated with diabetes are frequently met with in Calcutta among the better classes of natives. They are apt to become very large, to break down readily, and be accompanied with very serious constitutional disturbance. The knife should be very cautiously used in such cases, and only for the purpose of relieving tension and evacuating pus and slough.

CHAPTER XVI.

ABSCESSSES.

Cases, 129; Deaths, 14.

I HAVE only included in this section abscesses of such large size, or in such proximity to vital organs, or requiring such deep or dangerous incisions for their evacuation as to constitute the disease itself, or the operation performed for its cure, a substantial risk to life. The natives of Bengal are very prone to undergo suppurative inflammation. Their tissues appear to possess feeble vitality, and under the influence of *nava* acting upon them directly as a result of injury, or indirectly through the blood or nervous system, they are apt speedily to inflame and suppurate, the process being often associated with extensive tissue necrosis, and the suppuration being not rarely of a diffuse character. Very large and deeply seated abscesses often accompany and succeed the malarious and other fevers to which natives are so subject, and these, when they occur in the neighbourhood of joints and bones, are exceedingly apt to result in destruction of the articulations or extensive necrosis. The sudden increase of bulk caused by rapid pus formation and great infiltration of the parts surrounding the abscess cavity with inflammatory products, cause acute tension great constitutional disturbance, and aggravated tissue destruction, and the necessity and advantage of early and free incision are indisputable. But in these large and more or less diffuse suppurations occurring in unhealthy subjects, the invasion of the abscess cavity

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Bengalis prone to suppuration.

Pathology of abscess.

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Importance of
antiseptics.

by the process of putrefaction is prone to aggravate rather than amend. The local conditions are apt in such circumstances to deteriorate rather than improve. Profuse discharge of foetid material continues, the area of disease is extended, and new invasions of previously healthy parts give rise to fresh collections, demanding repeated counter-openings, or, if recovery takes place, it is very protracted, and large and very intractable sinuses remain. The constitutional condition also changes for the worse. The type of the fever, which was sthenic, acquires a hectic or typhoid complexion. Septicæmia or pyæmia may supervene, or a severe and rapidly fatal attack of diarrhoea or dysentery may speedily terminate life. The importance of opening these large and unhealthy abscesses under strict antiseptic precautions, and providing means of thorough and continuous drainage, is immense. Fortunately there is less difficulty in maintaining asepsis in the case of abscess than when more elaborate dissections and larger wounds are concerned. I have found the use of two or three layers of boracic lint next the wound, supplemented by an outer dressing of carbolic gauze, borated or salicylated cotton wool, to be quite sufficient to prevent putrefaction. The usual precautions, of thoroughly purifying the skin and opening under carbolic irrigation or spray, must of course be adopted.

A very interesting paper was read before the Calcutta Medical Society by my assistant, Baboo Gopal Chunder Chatterjee, M.B., in March 1881 (*vide Indian Medical Gazette*, vol. xvi., p. 114), in which he contrasted the result of dealing with large abscesses with the partial or thorough use of antiseptics. He found that the latter system unquestionably promoted comfort, cleanliness, saving of suffering and constitutional disorder, and rapidity of recovery.

In opening deep abscesses, such as axillary and iliac abscesses, I am in the habit of adopting Hilton's

method, which proceeds on the observed tendency of abscesses to travel and approach the surface along fibrous bands and fascial planes. I have found this plan to be an easy, safe, and successful one. Reference to Appendix A indicates that abscess is as rife in the provinces as in the metropolis. As it is doubtful whether these statistics include the same descriptions of abscesses as mine, no comparison of death-rates can be made.

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Hilton's
method.

I have arranged the abscesses on an anatomical basis, and shall append to the more important groups a few explanatory observations.

I might have added to these cases several instances of parotid abscesses of septic origin which were treated in the wards. The suppuration in these cases is of very sudden occurrence, and diffuse in character. It is accompanied by fever of low type. Free and early incision is necessary, but in many cases such abscesses are mere symptoms or incidents of a septic infection which speedily terminates life by blood-poisoning and exhaustion.

a. Abscesses of the Neck.—i. Mahomedan male, æt. 23. Deep abscess of the left parotid region, of five months' duration, which had opened into the external meatus. A free external opening was made and a drainage tube inserted. Complete recovery in 48 days. Had an attack of acute dysentery during his stay in hospital.

ii. Hindu male, æt. 30. Abscess over left mastoid process, of 2½ months' duration; had been opened three times; bare bone detected by probe. Sinus laid freely open and dressed for granulation. Left hospital after fourteen days with a small superficial sore.

iii. Native Christian female, æt. 18. Glandular swelling of three years' duration in left sub-maxillary region. Pus detected on exploration. Incision made antiseptically and drainage tube inserted; slight discharge continued for some time, but the wound eventually closed, and all swelling disappeared. Under treatment 53 days.

iv. Axillary Abscess.—European male, æt. 44. Seven-

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Axillary
abscesses ;

teen days' duration ; opened and drained antiseptically. Tube removed in nine days. Discharged in thirteen days.

v. Eurasian female, æt. 26. Twenty-five days' duration. Opened antiseptically by Hilton's plan ; 5 ozs. Drainage tube inserted. Complete recovery in eleven days.

vi. Eurasian female, æt. 15. Fifteen days' duration. Opened antiseptically by Hilton's method ; 10 ozs. ; tube inserted. Discharged cured in 24 days.

vii. Mahomedan male, æt. 35. Twenty days' duration. Opened antiseptically by Hilton's method ; 5 ozs. ; tube inserted ; very free discharge continued for some days. Finally closed in 34 days.

of the arm ;

viii. Abscess of Arm.—European male, æt. 21. Abscess of right arm of three weeks' duration following bruise. Opened antiseptically and tube inserted ; tube withdrawn on second day. Abscess healed in five days.

ix. Native female, æt. 28. Abscess in infra-spinous fossa of right side, of four days' duration. Opened and drained antiseptically. Another abscess detected at the upper part of right arm six days afterwards, and similarly treated. Erysipelas of the shoulder and arm supervened on the last operation. This delayed the closing of the sinuses, which continued to suppurate freely as long as the erysipelas lasted. Satisfactory closing of both was obtained after 68 days' treatment.

x. Of the Back.—An East Indian girl, æt. 14. There was a history of fall nine days ago from a height of about four feet, which was followed by a swelling in the back. On admission the bladder was relieved of about two and half pints of urine ; no signs of paralysis of limbs. A large abscess was situated on the back, which was opened under spray (under chloroform), and about 3 ozs. of healthy pus let out. Discharged after 84 days. Had enlarged spleen.

xi. Hindu male, æt. 36. Curvature of the cervical spine, associated with abscess extending on the left side of the spine from the nape of the neck to the inferior angle of the scapula. History of syphilis ; anæmic and feeble. Abscess opened antiseptically ; 8 ozs. of pus evacuated ; tube withdrawn in ten days ; wound healed soon afterwards. Another abscess formed at upper part of right thigh ; it was opened antiseptically, and healed in a week. An abscess of the right

calf, which had been opened without antiseptic precautions before admission, closed very slowly. Was under treatment for 86 days, and left hospital much improved in health.

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xii. **Of the Abdominal Wall.**—Native male, æt. 26. Had a swelling in the right side, with fever and inflammatory symptoms. It turned into abscess. The matter burrowed along the intermuscular planes of the abdomen, and passed through the external abdominal ring into the scrotum. Here a small opening formed, through which matter discharged freely, after a fortnight. The abscess, which was situated just below the costal arch, was laid open freely. A large slough (probably the whole of the internal oblique muscle) was drawn out through the opening. Drainage tubes put in. Recovered.

Parietal abscesses.

xiii. Hindu male, æt. 3. One month's duration; caused by a fall. Situated close to the navel on its right side below external oblique; opened antiseptically. Drained by caoutchouc tube. Healed up in twelve days.

xiv. East Indian male, æt. 3. Caused by a fall sustained four days before admission. Situated in right hypochondrium beneath external oblique; tubes removed on fifth day. Left hospital in ten days.

xv. Mahomedan male, æt. 24. Ten days' duration; consequent on sprain. Situated in left inguinal region, superficial to muscles. Discharged in eighteen days.

xvi. Mahomedan male, æt. 4. Fourteen days' duration. Situated in right hypochondrium in substance of transversalis muscle. Opened antiseptically; closed in ten days. Superficial wound healed a few days afterwards.

xvii. Native Christian, æt. 27. Arose during convalescence from operation for strangulated hernia (IX. 1. b. iv.) situated in right hypochondrium between peritoneum and muscles. Opened antiseptically by careful dissection. Healed in a fortnight.

xviii. Hindu female, æt. 60. Abscess of right iliac region following injury, of fifteen days' duration. Had opened spontaneously; cavity full of blood clot; aperture enlarged, thrombi removed, and drainage tubes inserted. Healed in 23 days.

xix. Mahomedan male, æt. 20. Fluctuating swelling of left hypochondrium, of eight days' duration. A small

CHAP. XVI. opening made and tube inserted. Antiseptic dressing
IX. 14. applied. Healed in ten days.

xx. Hindu male, æt. 30. Fluctuating swelling in left iliac region, of twenty days' duration. Opened antiseptically and drainage tube inserted; suffered from fever for a month, and urine became turbid and albuminous about three weeks after opening. Wound finally closed, and patient discharged in 68 days.

Perforation of
appendix;

xxi. **Fæcal Abscesses.**—A stout Punjabi Mahomédan, æt. 40, was admitted with a lumbar abscess of a fortnight's duration. The iliac fossa was swollen and fluctuating. The abscess was opened antiseptically beneath Poupart's ligament. The pus was extremely fœtid. Diffuse cellulitis extended beneath the skin of the thigh in all directions. The patient lived for 44 days. The opening continued to discharge very offensive matter with a distinct fæcal odour. Diarrhœa and prostration were the immediate precursors of death. A communication with the cæcum was found after death through the appendix vermiformis, and the body of the ilium was bare and infiltrated with gangrenous pus. (This case is fully reported in the *Indian Medical Gazette*, vol. xiv., 1879, p. 231.)

of cæcum.

xxii. A middle-aged lascar was taken ill about a month before admission with fever and pain in the right inguinal region, where a swelling formed. He had passed pus per rectum a few days before he came to hospital. A globular swelling to the right of the linea alba, and below the level of the umbilicus, was found to contain pus, and was laid open. The discharge was fæculent. He fell into a state of prostration with diarrhœa, and died in about two months. A large aperture of communication with the cæcum was found. The abscess cavity and interior of the bowel showed large polypoid masses of fibrinous lymph impregnated with fæculent matter.

The first of these cases is a good example of an accident to which Dr. Samuel Fenwick has recently called special attention in a very instructive clinical lecture (*Lancet*, Nos. 23 and 24 of vol. ii. of 1884, pp. 987 and 1039), namely, perforation of the appendix vermiformis. No concretion of any sort was found

in this instance, but it may have escaped with the pus. CHAP. XVI.
 No solid faecal material was emitted with the discharge, Perforation of appendix vermiformis.
 but it possessed a decided faecal odour, and its intense virulence is attested by the mischief which it wrought in the iliac fossa, and the destructive cellulitis which it set up when it came in contact with the cellular tissue of the thigh. The case belonged to that category in which the tissues outside of the peritoneum suffer, for there was no general and very little local peritonitis. The presence of diarrhoea is noteworthy. Dr. Fenwick has shown that this symptom is rather more frequent in that class of cases than in those in which the peritoneum suffers. The history of the case is obscure, and it is impossible to say whether the mischief originated outside or inside of the intestine. A very interesting case of perforation of the appendix due to accumulation of ill-masticated fragments of pistachio nut, which I attended along with Dr. Cayley, will be found fully narrated in the *Indian Medical Gazette*, vol. xv., 1880, p. 338.

In the second case (xxii.) perforation of the caecum had occurred. The history of this case points to the abscess having in the first instance formed outside of the gut. Great reparative efforts had been made. Diarrhoea was also a very prominent feature of this case.

xxiii. Abscess of Liver.—Hindu cook, aet. 26. Hepatic Perihepatic abscess.
 symptoms of three months' duration; admitted with fluctuating swelling in epigastrium; left lobe of liver enlarged. Opening made antiseptically, and about one pint of hepatic pus let out. Two drainage tubes inserted. Discharge at first profuse and grumous, gradually became scanty and more tenacious and lymph. Remained sweet for a fortnight and then became putrid; vomiting, pain in the chest and prostration gradually supervened, and he died of Death. Putrefaction.
 collapse in thirty days. The abscess was found to have eroded the left lobe of the liver deeply, and to have worked its way into the pericardium and stomach.

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Aseptic case.

Death by
dysentery.

Aseptic case.

Dysentery.

Aseptic case.

Double
abscess.

Putrefaction.

Death.

xxiv. Hindu male, æt. 25. Symptoms of one month's duration. Admitted with a fluctuating swelling in epigastrium, to right of middle line; opened antiseptically; discharge at first purulent and then like prune juice; tube removed and cavity closed in nine days. Symptoms of dysentery supervened, and patient died of this disease thirteen days after the opening of the abscess.

xxv. Hindu male, æt. 25; 23 days' duration; fluctuating tumour in right hypochondrium. Liver dulness extended three inches below costal arch, including fluctuating area. An incision was made under strict antiseptic precautions, and two drainage tubes inserted; pus characteristic of liver abscess evacuated; one tube withdrawn in fifteen and the other in 25 days. Wound healed shortly afterwards. Suffered from dysentery for a week. Remained 34 days in hospital.

xxvi. East Indian male, æt. 35. Admitted with a fluctuating swelling in right hypochondrium; found on exploration to contain sanious pus. Opened under spray. Liver not enlarged. A large quantity of brickdust coloured matter escaped; drainage tube inserted and antiseptic dressing applied. The discharge continued profuse for some time. It gradually became scantier, lighter, and more sticky. Remained aseptic throughout. Wound healed in 35 days.

xxvii. Hindu male, æt. 40. Fluctuating swelling of right hypochondrium, of four months' duration; history of fever. Right lobe of liver enlarged. Thick sanious pus discovered by exploration. A small opening made and drainage tube inserted under antiseptic precautions. High fever and delirium ensued, but improvement took place. Discharge very profuse, like apple jelly. Became putrid and changed its character to a thin grumous fluid a few days before death. Got fever of a typhoid type, and died comatose 31 days after operation. On post-mortem examination, the surface of the liver was found to be deeply eroded. Another large abscess existed at the back of the right lobe. The substance of the liver was extensively destroyed. The constitutional disturbance which proved fatal followed the change in the character of the discharge.

xxviii. Hindu male, æt. 54. Admitted with a fluctuating

swelling in the left hypochondriac region, of one month's duration; development accompanied by fever. Explored, and found to contain pus. Opened antiseptically by a bistoury; 14 ozs. of thick reddish brown matter escaped; tube inserted and antiseptic dressing applied. No constitutional disturbance. Discharge gradually became scantier and more lymph. Discharged in 46 days perfectly recovered. Dressings changed every two, three, or four days; the interval being prolonged and tube shortened as the discharge became scanty.

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Aseptic case.

Abscesses of the liver are usually treated in the medical wards of the Medical College Hospital. In these six cases the collection was so superficial as to lead at first sight to a diagnosis of abscess of the abdominal wall. The true character of the case revealed itself on an incision being made for the evacuation of the matter. The discharge in cases implicating the liver is so characteristic as to leave no doubt as to the nature of the case. Moreover, instruments introduced into the cavity passed deeply into the substance of the liver. Three of the cases recovered satisfactorily under strict antiseptic management. In two of the fatal cases (xxiii. and xxvii.) the abscess cavity underwent putrefaction, and a change for the worse speedily followed this event. In the third fatal case (xxiv.) dysentery supervened and caused death, although the result of operation promised to be satisfactory.

Summary of cases.

xxix. Psoas Abscess.—Hindu male, æt. 30. Spinal curvature with fluctuating swellings in the lumbar and iliac regions; abscess cavity reached by incision under antiseptic precautions beneath Poupart's ligament. Two drainage tubes inserted; one withdrawn in two days, and the other gradually shortened. Discharge became scanty and serous. Patient left the hospital, contrary to advice, in 144 days, greatly improved in general health and able to walk without discomfort. A small sinus exuding a slight serous discharge still existed in the groin. Successful.

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xxx. Iliac Abscess.—East Indian girl, æt. 5. Fall six years ago, followed by abscess on right side. Opened above Poupart's ligament. Died of septicæmia in seven days. (Dr. Palmer.)

xxxi. Hindu male, æt. 45. One and a half month's duration. Opened antiseptically below Poupart's ligament. Discharged cured in 44 days.

xxxii. Hindu male, æt. 21. Two months' duration. Pointing above Poupart's ligament. Opened antiseptically at this place. Recovered. Discharged in 70 days.

xxxiii. Hindu male, æt. 12. One month. Opened beneath Poupart's ligament antiseptically. Good recovery. Discharged in 26 days.

The last three cases remained aseptic throughout, and made excellent recoveries.

xxxiv. Hindu male, æt. 17. Three weeks' duration. Commenced with fever; situated in right iliac fossa. Opened antiseptically below Poupart's ligament by a vertical incision through skin and fascia lata half-way between anterior superior spinous process of ileum and femoral artery, over the iliacus muscle. The cavity was reached by director, the track being subsequently enlarged and drainage tube inserted. Remained aseptic; healed in fifteen days. Left hospital in 44 days.

xxxv. Hindu male, æt. 18. One month's duration. Caused by strain. Left side opened as in cases xxxi., xxxiv.; half a pint of pus removed. Drainage tube removed in thirteen days. Left hospital in 52 days. Discharge sweet throughout.

xxxvi. Mahomedan male, æt. 35. Fifteen days' duration. Left side; fluctuating swelling in upper part of left thigh also, continuous with the iliac swelling. Opened antiseptically at the same point as in case xxxiv. Tubes inserted upwards and downwards. Drainage tubes withdrawn finally in 29 days. Left hospital in 44 days. Two pints of pus removed. Remained aseptic throughout.

xxxvii. Hindu female, æt. 6. Two weeks' duration. History of fall and subsequent fever. Left side. Operation performed as in case xxxiv. Tubes removed in eleven days. Discharged in fourteen days.

xxxviii. Hindu male, æt. 22. Left side. Twenty days'

duration. High fever. Opened antiseptically below Poupart's ligament. One and a half pint of pus gushed out; fever subsided in 24 hours. Two drainage tubes inserted—one being withdrawn in two days, and the other gradually shortened and finally removed in 25 days. Discharged in 55 days, quite recovered.

xxxix. Hindu female, æt. 40. Right side. Two months' duration. Opened antiseptically below Poupart's ligament; about half a pint of pus removed; a drainage tube inserted. Shortened in six days and withdrawn in twelve. Discharged in 61 days, quite well.

xl. Mahomedan male, æt. 30. Right side. Two months' duration. Opened antiseptically below Poupart's ligament by Hilton's method; about one and a half pint of pus gushed out. Two tubes inserted; one removed next day, the other in eleven days. Left hospital in 38 days.

xli. Hindu male, æt. 16. Left side. One month's duration. Opened antiseptically below Poupart's ligament; serum and lymph issued; no pus; drainage tube inserted. Discharge continued serous and aseptic; tube removed in seven days. Wound healed and swelling disappeared. Discharged in three days.

This case presented all the symptoms of an abscess—tense, tender swelling in iliac fossa, fluctuation, permanent flexion of hip-joint, &c. The swelling was undoubtedly inflammatory, but had not undergone suppuration.

xlii. East Indian female, æt. 45. Left side. Twelve days' duration. Opened below Poupart's ligament; tube removed in six days. Discharged in 41 days.

xliii. European male, æt. 40. Right side. 26 days' duration. Two drainage tubes inserted; one removed in two days, and the other in thirteen days. Discharged in 29 days.

xliv. European male, æt. 15. Left side. Fifteen days' duration. Opened antiseptically below Poupart's ligament; tube removed in eight days. Wound healed in nineteen days.

xlv. Hindu female, æt. 30. Large sinus of two years' duration in left gluteal region, abscess in right iliac fossa.

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Fatal putrid
case.

Caries of lumbar vertebrae. History of syphilis and salivation. Abscess opened above Poupart's ligament; putrid pus issued; drainage tubes inserted in sinuses and abscess. Discharge continued profuse and putrid, and patient sank from exhaustion twelve days after the opening of the abscess.

This was a case of psoas rather than iliac abscess. Pus had found its way through the greater sacro-sciatic foramen into the left gluteal region. The putrid condition of the abscess on the right side was evidently due to communication with the putrid sinuses on the left side.

xlvi. East Indian male, æt. 13. Right side. Two months' duration. Opened antiseptically below Poupart's ligament, and three drainage tubes inserted; one tube removed in one day, the second in three days, and the third in ten days. Discharged in 61 days.

Protracted
case of putrid
iliac abscess.

xlvi. Hindu male, æt. 28. Abscess of six months' duration. Had been mistaken for a bubo, and opened in the left groin, profuse foetid discharge came from a sinus through which a probe passed deeply into the left iliac fossa. Thigh flexed on abdomen and leg on thigh. Suffering from hectic fever. A free opening was made below Poupart's ligament half-way between the anterior superior spinous process of the ilium and the femoral artery, and a drainage tube inserted into the abscess cavity. Very free discharge continued. The original sinus closed, and the counter-opening had almost healed, when fresh accumulation took place, with fever and rigor. The wound was reopened and tube again inserted. The sinus finally closed under careful treatment, and patient was discharged 258 days after the counter-opening had been made. His health was greatly improved. Some thickening remained in the iliac fossa, and some stiffness of the hip-joint.

Summary of
cases.

These eighteen cases of abscess forming in the iliac fossa constitute a very interesting group. Two cases proved fatal. Of the first (xxx.) I had no personal cognisance. The second (xlv.) was a putrid abscess depending on diseased spine in a bad subject. The

remaining sixteen made excellent recoveries under the treatment detailed in case xxxiv. In case xlvii, in which the abscess had been opened above Poupart's ligament without antiseptic precautions, the period of convalescence was very protracted. Sir Joseph Fayrer draws special attention to this class of cases ("Clinical Surgery," p. 602; and "Clinical and Pathological Observations," p. 439). He recommends incision through the abdominal wall; but incision below Poupart's ligament, according to Hilton's method, is much easier and quite as effective, and possesses the great advantage of not weakening the abdominal parietes.

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Fayrer's cases.

xlvi. **Pelvic Abscess.**—Hindu female, æt. 45. Symptoms of one month's duration. Fluctuating swelling detected in recto-vaginal septum. It was punctured per vaginam, and about a pint of matter withdrawn; canula retained for 24 hours; matter continued to pass per vaginam for a week. The swelling gradually subsided, and she was discharged well in 20 days.

Pelvic abscess evacuated per vaginam.

xlix. **Prostatic Abscess.**—Englishman, æt. 30. Admitted with retention of urine. Prostatic abscess discovered by rectal examination; laid open freely through perinæum; No. 10 catheter passed. Left hospital in fourteen days. Wound closed; able to make water in full stream.

Prostatic abscess causing retention.

l. **Peri-Rectal Abscess.**—Native Christian, æt. 25. Abscess surrounding rectum, of three months' duration, burst into the gut twenty days ago; laid freely open into gut on both sides; sphincter divided. A second free incision required in 57 days. Recovered.

li. **Ischio-Rectal.**—Hindu male, æt. 24. Admitted with a large ischio-rectal abscess of twelve days' duration. It burst of itself after admission as a catheter was being passed for the relief of his bladder. The opening was enlarged, and the sphincter divided; dressed with carbolic oil and lint. The cavity extended upwards along the rectum backwards to the sacrum, and forwards into the perinæum. On the 27th day had an attack of erysipelas, which disappeared.

Large ischio-rectal abscess.

Erysipelas.

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Ischio-rectal
abscesses.

after a fortnight. Discharged perfectly cured after 86 days.
(Dr. Palmer.)

lii. Hindustanee male, æt. 30. Had an inflammatory swelling in the right ischio-rectal region. The abscess resulting from it extended to the other side of the rectum, which was thus encircled. Laid open freely; 4 ozs. of foetid pus let out. The sphincter divided. Dressed with cotton and carbolic oil. Discharged cured after a month.

liii. Hindu male, æt. 27. Had symptoms of abscess about the rectum ten days ago. It was quite small, and encroached more into the perinæum than backwards. Treated in the same way. Discharged cured after a month.

These four cases are good illustrations of the condition referred to in Chapter XV., p. 241.

Gonorrhœal
abscesses
outside of
urethra;

liv. Perinæal Abscesses.—Hindu male, æt. 30. Twelve days' duration. Gonorrhœa three months ago. A free perinæal section was performed, and about five ounces of very foetid pus evacuated. No communication existed with the urethra. The wound healed in eighteen days. A slight stricture of the urethra was gradually dilated.

lv. Hindu male, æt. 28. One month's duration following gonorrhœa; urethra strictured. Free perinæal section performed, and about half an ounce of pus evacuated. No escape of urine through wound then or subsequently. Wound healed kindly; stricture gradually dilated. Discharged in 63 days.

communicating
with urethra.

lvi. Hindu male, æt. 38. Fifteen days' duration; followed gonorrhœa of three months' standing; urethra strictured; free incision in middle line of perinæum, a small quantity of pus exhalng a urinous odour evacuated. Stricture gradually dilated. A few drops of urine used to come for a time through the wound during micturition. It finally closed, and patient left hospital in 34 days quite recovered.

lvii. East Indian clerk; æt. 35. Painful swelling in perinæum of three days' duration, accompanied with fever and difficult micturition. Perinæal section performed. Wound closed in eleven days. No urine came through it.

lviii. Mahomedan male, æt. 35. Suffered from gonorrhœa seventeen years ago, succeeded by gleet. Symptoms of

stricture gradually appeared, and these have gradually become more pronounced. Had strong fever thirteen days ago, succeeded by painful swelling in the perinæum. Retention of urine for seven days. Scrotum and penis œdematous. Bladder extremely distended. Crackling boggy swelling above pubis. Pronounced symptoms of uræmia. Perinæum laid open freely. A large quantity of fœtid pus and urine gushed out. Urethra freely laid open, and bladder emptied by catheter No. 10 passed per urethram. Two days afterwards a free incision made in the middle line above pubis. A large quantity of fœtid pus and slough removed. Both wounds healed gradually by granulation. Full-sized catheter passed occasionally. Discharged well in sixteen days.

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Urinary
abscess.

lix. Hindu shopkeeper, æt. 22. Gonorrhœa five months ago, followed by gleet and symptoms of stricture. Painful swellings appeared in perinæum and right ischio-rectal fossa, with fever, a week ago. Micturition difficult; health bad; liver and spleen enlarged. Perinæum laid freely open, pus and urine welled out. Urethra opened. Ischio-rectal abscess opened, the sphincter being freely divided at the same time. No. 10 catheter passed into bladder per urethram. Did well for 23 days, wounds granulating and contracting; urethra kept open by passing full-sized catheter. Then got diarrhœa, which resisted treatment, and proved fatal by exhaustion in twelve days—35 days after operation.

Death by
diarrhœa.

lx. Jew, æt. 48. Painful swelling in perinæum of twenty days' duration; laid open freely. Pus issued and afterwards urine. Wound healed in 34 days. Bougies 3 and 4 were passed on one occasion, but this was succeeded by so severe an attack of fever that the experiment was not repeated.

lxi. Mahomedan male, æt. 35. Painful swelling in perinæum with fever of ten days' duration; laid open freely in middle line; about 2 ozs. of pus issued. Wound healed, and patient discharged in seventeen days. No urine came through the opening.

lxii. Hindu male, æt. 40. Painful fluctuating perinæal swelling of one month's duration. Fever and difficulty of micturition; laid open freely. Sphincter ani divided as the cavity reached the bowel. Wound healed by granulation in 35 days. No urine escaped through it.

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Remarks.

Those cases in which no issue of urine took place through the incision made into the abscess, prove that at least some of these abscesses do not take their origin from within the urethra. I am inclined to think that very few of them do, and that communications with the urethra, when they exist, are secondary.

Erysipelatous. lxiii. **Scrotal Abscesses.**—Hindu male, æt. 55. Right side. Seven days' duration, accompanied with high fever, great infiltration of scrotum and cord; obscure fluctuation posteriorly; laid open antiseptically, and drainage tube inserted. Recovered in eighteen days.

lxiv. Hindu male, æt. 25. Right side. Eight days' duration. Hydrocele on same side; abscess opened antiseptically, and hydrocele tapped. Recovered in 30 days.

Ditto. lxv. Hindu male, æt. 37. Erysipelatous inflammation of scrotum, cord and abdominal wall, of twelve days' duration, accompanied with high fever and marked prostration. As soon as evidence of the existence of pus was obtained, a free opening was made in the scrotum, and above Poupart's ligament antiseptically, and drainage tubes inserted. The infiltration slowly subsided, and the apertures took a long time to heal. Discharged in 40 days.

lxvi. Chinaman, æt. 43. Abscess of left tunica vaginalis, of fifteen days' duration. Opened antiseptically, and drainage tube inserted. Recovered in 24 days.

lxvii. Mahomedan male, æt. 45. Abscess of right tunica vaginalis, of 22 days' duration. Treated by free incision, and drainage under antiseptic precautions. Recovered in 26 days.

lxviii. East Indian male, æt. 30. Hydrocele tapped six days before, and iodine injected; cellulitis and suppuration followed. Laid open antiseptically. Tunica explored, a little clear fluid escaped. A cellular slough was discharged through the incision, which healed up soon thereafter. The scrotum regained its natural size. Detained in hospital 28 days.

Ditto. lxix. Chinaman, æt. 48. Suffered from fever and swelling of scrotum for four days. Tunica distended. It was tapped on two occasions, and turbid serum withdrawn. An abscess formed in the cellular tissue of the scrotum, which

was laid open antiseptically. This underwent rapid repair, the tunica regained its normal size, and the patient was discharged well in 35 days. CHAP. XVI.
IX. 14.

lxx. Eurasian male, æt. 45. Twenty seven days' duration. Opened antiseptically; 6 ozs. of pus; closed in ten days.

Cases lxiii. lxv. and lxix. illustrate a condition which is not uncommon during and after the rains. Diffuse
inflammation
of scrotum. A patient has, perhaps after malaise, a severe rigor followed by fever, during whose development rapid infiltration of the cord and scrotum of one or both sides occurs. The tunica is apt at the same time to undergo rapid distension. The infiltration may implicate the abdominal wall or extend between or beneath the abdominal muscles in the areolar planes. In rare cases peritonitis may occur. The fever pursues a remittent course, and is apt to be very high in range and prostrating in effect; cases of this sort often prove fatal by blood poisoning in a few days. The swelling may resolve on subsidence of the fever in a week or ten days, more frequently suppuration of a diffuse kind results, the pus being of an ichorous or sanious kind and peculiarly prone to putrefy. Antiseptic precautions, free opening, and efficient drainage are specially valuable in this class of cases. Cases lxvi. and lxvii. were inflamed hydroceles treated by free evacuation and drainage.

lxxi. Abscess of Tunica Vaginalis.—East Indian male, Inflamed
hydrocele. æt. 18. Twenty days' duration. Formation accompanied with fever and shivering; fluid detected in tunica, which, on tapping was found to be purulent; free incision made. The cavity filled with granulation material, and closed in 37 days.

lxxii. Mahomedan male, æt. 55. Left hydrocele of ten years' standing; tapped on two occasions; became swollen, tense, and painful recently. Pus discovered on tapping tunica; laid open and drainage tube inserted. Fever ensued, which lasted for a week; tunica sloughed off, and wound healed and granulated in 54 days.

CHAP. XVI.

IX. 14.

lxxiii. Native Christian male, æt. 18. Right hydrocele; tapped five days previous to admission; inflamed. Pus discovered by exploring; tunica opened antiseptically, and drainage tube inserted. Healed in ten days.

Severe and
protracted
case.

lxxiv. Gluteal.—A native male, æt. 30. A large abscess extending from the crest of the ilium to below the trochanter major. About 2 pints of pus let out. There was profuse discharge, which was all along sweet. Dressed almost every day with carbolic gauze. The whole thickness of the ala of the ilium necrosed, and was absorbed. After a long struggle the patient was cured, and left hospital with stiffness of the knee and hip of the same side, after about eight months. The cavity was kept aseptic throughout.

Death by
dysentery.

lxxv. Native male, æt. 28. Came in with a large gluteal abscess situated between the gluteal muscles. At first opened under spray, and about 6 ozs. of pus let out. Sinuses burrowed in all directions, and the patient died of chronic dysentery after three months. Dressed with carbolic oil. (Dr. Palmer.)

lxxvi. Hebrew male, æt. 3. Eight days' duration. Left side. Opened antiseptically above and behind trochanter major. Discharged in seven days, abscess quite healed.

Ditto.

lxxvii. Hindu male, æt. 40. Twenty days' duration. Left side. Very large abscess extending from crest of ileum to below trochanter; suffered much from fever. Opened antiseptically; 2 pints of pus evacuated. Remained aseptic; got an attack of sloughing dysentery, of which he died, seven days after operation.

lxxviii. Hindu male, æt. 50. Two months' duration. Situation and size similar to last. Opened behind great trochanter; 2½ pints of matter evacuated; four drainage tubes inserted, which were gradually withdrawn, the last seven days after operation; got a glandular abscess in neck, which was opened and scraped out. Left hospital in 33 days with a small sinus in neck.

Case of
pyæmia.

lxxix. Eurasian female, æt. 20. Fifteen days' duration. History of fever and ague; a small abscess on right thumb was opened nine days before admission. Left side. Opened antiseptically, 2nd November; a small abscess of left forearm had been opened on 29th October; an abscess at upper third of right thigh opened 5th November. Fever

continued high; dysentery appeared on 11th; bed sore formed; rigors set in on 11th, frequently repeated. Erythema nodosum observed on 12th. Joints became painful. Abscesses formed in arms and upper part of right thigh; opened on 13th. Pneumonia detected on 15th. Became delirious; died on 16th. A case of pyæmia. All the abscesses which were opened remained aseptic.

lxxx. Hindu male, æt. 32. Right side; 25 days' duration. Whole extremity cedematous. Opened antiseptically behind trochanter; 32 ozs. of pus escaped. Three drainage tubes inserted in different directions. The swelling of the leg subsided, and repair was in satisfactory progress when on the 16th day the wound became unhealthy, some constitutional disturbance occurred, and the leg swelled again. The knee-joint also filled with fluid. Bagging of matter occurred on the front of the thigh, requiring free counter-opening. The swelling of the limb and joint now disappeared, and complete recovery took place after a stay in hospital of 61 days. Very severe case.

lxxxi. Hindu male, æt. 25. Right side; three days' duration. Opened antiseptically; 22 ozs. of pus escaped. Two tubes inserted; one withdrawn in two and the other in seven days. Discharged in nineteen days.

lxxxii. Hindu male, æt. twelve. Left side. Followed an injury sustained a week ago. Opened antiseptically; 8 ozs. of pus; drainage tube inserted, withdrawn in eight days. Another abscess formed in front of the thigh from which 4 ozs. of pus were let out. It healed rapidly. Discharged in 44 days.

lxxxiii. Hindu male, one and a half year old. Sustained Putrid case. a fall two months ago. An abscess formed in the buttock and thigh of right side. Latter opened five days before admission without antiseptic precautions. A long putrid sinus resulted. Gluteal abscess opened antiseptically; tubes inserted both in sinus and abscess. Was doing well till the seventh day, when cedematous swelling of the limb occurred, with fever and aphthous ulceration of lips, tongue, and mouth. Diarrhœa followed, and the child died eighteen days after operation. Death by diarrhœa.

lxxxiv. East Indian female child, æt. 4. Abscess of four days' duration. Opened antiseptically. Healed in twelve days.

CHAP. XVI.

IX. 14.

Abscess in
Scarpa's
triangle.

lxxxv. Hindu female, æt. 18. Fifteen days' duration. Below left gluteus maximus. Opened antiseptically. Healed in 23 days.

lxxxvi. Of Thigh.—An East Indian male, æt. 14. First appeared seventeen days ago. It was situated in the upper part of the thigh underneath the vessels. An incision was made on the inner side of the thigh on the abductor brevis, and the director and finger carried along the intermuscular space. About 5 ozs. of laudable pus let out. Dressed under antiseptic precautions. Discharged after 54 days, cured. Had severe constitutional disturbance and asthma.

lxxxvii. A Mahomedan male, æt. 20. Had inflammation of one finger resulting in necrosis of last phalanx about a fortnight ago. Abscess of the thigh formed about a week ago. It was situated close to the femur. About an ounce of pus let out under spray; the discharge was foetid next day. The cavity filled up without any complication. Another (axillary) abscess formed, and was opened by the same method. Discharged after 40 days.

lxxxviii. Native male, æt. 45. Commenced fifteen days' ago. Situated on the inner aspect of the thigh at about its middle. About 8 ozs. of pus let out. Dressed with carbolic gauze under spray. Discharged cured after two months. The limb was put up in splint.

Septic case.

lxxxix. Native male, æt. 50. Duration twenty days. After fever. It burst of itself, and about 15 ozs. of thin whitish fluid flowed out. Dressed with carbolic gauze after injecting the cavity. Had troublesome sinuses, which were not cured until rest was secured by means of splint. Discharged after four months and a half.

Protracted
recovery.

xc. Ooria female, æt. 35. Large abscess of thigh above the knee. History of injury a fortnight before. Opened under chloroform and under spray. Pus about 5 ozs. Discharged cured after 38 days.

xc. East Indian male, æt. 32. Deep-seated abscess of left thigh. Opened antiseptically. Left hospital well in 55 days. Delay caused by re-formation of abscess owing to premature withdrawal of tube.

Fatal case.

xcii. Hindu male, æt. 26. Three weeks' duration. Continued and severe fever; very low. Large deep-

seated abscesses situated in both thighs. Opened simultaneously under antiseptic precautions. Died in four days of prostration.

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IX. 14.

xciii. Portuguese male, æt. 35. One week's duration History of injury. Opened antiseptically. Premature removal of tubes caused re-accumulation. Recovered completely in 60 days.

xciv. Hindu male, æt. 37. Six weeks' duration. Suffering from diabetes; very much emaciated. Opening made on inner side of leg, and four tubes passed up and down. About 3 pints of pus removed. Discharge continued copious; tissues of leg and thigh sloughed, and patient was removed 31 days after operation in a dying state.

Diabetic abscess.

Death.

xcv. Hindu female, æt. 25. Fifteen days' duration. Back of left thigh. Opened and dressed antiseptically; tubes removed in fourteen days, Discharged 21 days after operation.

xevi. Eurasian male, æt. $1\frac{1}{2}$. Nine days' duration. Situated between adductor magnus and hamstrings of right side. Opened and dressed antiseptically. Drainage tube removed in six days. Left hospital quite recovered in ten days.

xcvii. Native Christian female, æt. 30. Deep-seated abscess of front of right thigh, of seventeen days' duration. Skin divided by scalpel, and abscess reached through vastus, by director; two tubes inserted—one removed in three days, and the other in eleven. Left hospital in 34 days.

xcviii. Hindu male, æt. 24. Deep-seated abscess of front of left thigh, opened by scalpel and finger; two tubes inserted—one removed in thirteen and the other in fifteen days. Discharged in 28 days.

xcix. Hindu male, æt. 35. Erysipelatous swelling of left thigh, of ten days' duration. Pus being detected deeply by a fine trochar, a free opening was made, through which some sanious matter issued; two tubes inserted. The erysipelas became more intense, and symptoms of prostration occurred on fifth day, on the evening of which patient died.

Death.

c. Hindu male, æt. 30. Abscess of right thigh following lymphangitis; opened antiseptically; catgut drain inserted. Healed in eight days. Discharged in eleven days.

CHAP. XVI.

IX. 14.

Aseptic cases.

ci. Eurasian male, æt. 19. Left thigh; of three days' duration. Diffuse; opened antiseptically; two drainage tubes inserted—one withdrawn in five and the other in thirteen days. Discharged in 30 days.

cii. East Indian female, æt. 14. Left side. Five days' duration; opened antiseptically. Healed in 39 days.

ciii. Jewess, æt. 29. Right side. Fourteen days' duration, following lymphangitis; opened antiseptically; tube withdrawn in nine days. Discharged in sixteen days.

civ. East Indian male, æt. 7. Left side. One week's duration. Situated in popliteal space; leg much swollen; opened antiseptically; cavity healed slowly; knee-joint somewhat contracted, and had to be straightened by a McIntyre splint. Remained in hospital 103 days.

cv. Hindu male, æt. 40. Left thigh; one month's duration. Very large and deep; opened antiseptically through vastus externus; two tubes inserted—one removed in five and the other in 21 days. Discharged in 72 days.

cvi. East Indian male, æt. 45. Front of right thigh. One month's duration; consequent on injury. One tube inserted; bagging took place, and a counter-opening and second tube became necessary. Discharged in 36 days.

cvii. European male, æt. 30. Right thigh. History of lead poisoning; wrist drop; opened antiseptically, and tube inserted; removed in three days. Discharged in fifteen days.

In several of these cases the matter formed in the loose cellular tissue surrounding the periosteum of the femur anteriorly and externally, and access could only be obtained to it through the vastus externus; the fibres of the muscle were separated by finger or director after the skin and fascia lata had been opened by knife.

cviii. East Indian female, æt. 10. Four days' duration, under extensor muscles of right thigh. Opened antiseptically by Hilton's plan. Healed in ten days.

cix. Mahomedan female, æt. 35. Chronic abscess of left thigh, of two months' duration. Opened antiseptically. Healed in eighteen days.

cx. Eurasian female, æt. 28. Large abscess of upper part of left thigh, of ten days' duration, Opened antiseptically by Hilton's plan. Healed in eight days. CHAP. XVI.
IX. 14.
Aseptic cases.

cx. Eurasian female, æt. 30. Large abscess of left thigh of one month's duration. Opened antiseptically. Healed in seven days.

cxii. East Indian male, æt. 27. Large deep abscess of left thigh, of seven days' duration. Opened antiseptically by Hilton's method. Healed in 39 days.

cxiii. Native Christian female, æt. 30. Large abscess behind left thigh, of five days' duration. Opened antiseptically by Hilton's method. Healed in fourteen days.

cxiv. Chinese male, æt. 16. Large deep abscess of upper part of right thigh, of fifteen days' duration. Opened antiseptically. A long sinus had to be laid open in seventeen days. Finally healed in 54 days.

cxv. **Popliteal Abscesses.**—East Indian student, æt. 14. Diffuse cellulitis of seven days' duration; fluctuation over popliteal space. Opened antiseptically. Healed in eight days.

cxvi. Hindu male, æt. 14. Inflammatory swelling behind knee-joint, of twelve days' duration. Knee-joint acutely flexed. Pus detected, and antiseptic opening made. Healed in 26 days. Joint gradually straightened.

cxvii. Hindu male, æt. 11. Similar case of twenty days' duration. Opened antiseptically. Healed in eighteen days.

cxviii. **Abscess of Leg.**—Eurasian seaman, æt. 48. Twenty-three days' duration. Admitted July 27. Situated beneath deep fascia of left side. Discharged well.

cxix. Re-admitted 8th November, 49 days after discharge, with a large abscess of same leg, of eight days' duration. Opened antiseptically, and closed in 50 days. Knee-joint swelled, and abscess pointed in popliteal space; this was opened on 1st December, after the former, and closed in 60 days. The knee-joint gradually subsided. It remained weak, and some lateral motion was elicited by manipulation. A starch bandage was put on. He is able to use the leg without pain or discomfort. There has been no re-appearance of abscess. Complicated case.

cxx. Eurasian male, æt. 36. Eight days' duration. Situated beneath deep fascia. Discharged on 1st September. Well in 24 days.

CHAP. XVI.
IX. 14.

cxxi. Hindu male, æt. 34. Right leg. Twelve days' duration. Whole leg swollen; opened on inner side antiseptically; tube inserted; removed in fifteen days. Discharged in 29 days.

cxxii. Eurasian female, æt. 14. Collection under sural muscles, of fifteen days' formation. Opened antiseptically on inner side of leg. Discharged in 35 days. Knee-joint had to be forcibly straightened.

Complicated
case.

cxxiii. East Indian, æt. 24. Had severe inflammation of the left leg and foot. Collections of matter formed about the ankle, which were opened under chloroform. Communication existed between the abscess cavity and the joint. Altogether four incisions were made. Discharged cured, after 65 days, with a stiff ankle-joint.

cxxiv. Multiple Abscesses.—Hindu male, æt. 45. Had five abscesses in different parts of the body, said to have succeeded a fall sustained two months ago. They were opened antiseptically as they matured. Discharged well in 33 days.

cxxv. European male, æt. 10. Four large abscesses in different parts of the body. Patient in bad health, anæmic and emaciated. They were opened antiseptically, and healed kindly. Discharged in eighteen days.

cxxvi. Eurasian female, æt. 29. Had suffered before admission from six abscesses in the breast, axilla, and other places. After admission, four additional abscesses formed; they were opened, and drained antiseptically. Tonic treatment was adopted, and she was discharged in good health, after 92 days' treatment.

Abscesses of
liver, &c.

cxxvii. East Indian male, æt. 31. Admitted with a large abscess of left thigh, of seventeen days' duration, which followed over-fatigue, and formed with fever. An abscess at the back of the right thigh was subsequently detected, and then an abscess of the liver. They were opened, and drained antiseptically on 20th, 22nd, and 26th June. The tubes were gradually shortened, and finally withdrawn on 27th June (right thigh), 30th June (left thigh), and 17th July (liver). The wounds healed up soon after, and he was discharged on the 21st July, 32 days after admission.

Aseptic.

Successful.

cxxviii. Eurasian male, æt. 36. Acute abscess of right arm and right thigh, of twelve days' duration. Opened

simultaneously with antiseptic precautions. Drainage tubes inserted. Healed in seventeen days. CHAP. XVI.

cxix. Hindu male, æt. 32. Axillary abscess of right side and abscess of right arm, of thirteen days' duration. IX. 14. Severe case.
Opened spontaneously; tube inserted. Five other collections formed in different parts of the body. Got pneumonia, diarrhoea, and bedsores. Abscesses laid open, and suitable constitutional remedies given. Recovered in 98 days.

Many of the cases included in this series (lxxiv. to cxix.) illustrate the remarks made at the commencement of this chapter regarding the rapid development of immense abscesses, and the advantage of free antiseptic incision and drainage. In many of the cases the suppuration was evidently of pyæmic origin.

CHAPTER XVII.

REPARATIVE OPERATIONS.

Cases, 61 ; Deaths, 2.

Deformities in
India. e

DEFORMITIES, both congenital and acquired, are common enough in India ; but unless they absolutely incapacitate for labour, or constitute a cause of substantial pain or inconvenience, their subjects seldom resort to hospitals for their cure. These cases are therefore not to be accepted as a fair representation of the amount of this kind of infirmity existing among the inhabitants of Bengal.

The groups of cases associated in this section differ very widely as regards both the circumstances calling for surgical interference and the particular kind of operation resorted to. The cases for the most part explain themselves, but with respect to some of the rarer a few explanatory remarks have been added.

I. FOR ATRESIA ORIS.

Cases, 8 ; Deaths, 0.

X. 1.
Salivation.

i. A native lad, æt. 8. Was salivated for fever ; sloughing of the right cheek, ulceration of the gums, and necrosis of the lower jaw followed. The jaws were completely tied down to each other by a cicatricial band, and an opening existed in the upper lip leading to the mouth. The bands were divided under chloroform, and the jaws kept apart. This was followed by a little improvement. Removed by his father after a fortnight, before the completion of the treatment.

Cancrum oris,

ii. An East Indian girl, æt. 7. Could hardly open her mouth after an attack of cancrum oris. The bands, which

were situated on the right side, were divided under chloro-
form, and the jaws were afterwards separated by means of
gags. Discharged almost cured after a month and half.

CHAP. XVII.
X. 1.

iii. Native Christian female, æt. 19. Mouth closed by
tight cicatricial band consequent on ulceration of the cheek
and gum, caused by irruption of wisdom tooth. Band
divided freely; the tooth, which was growing into the
cheek, extracted; mouth kept open by occasional use of
Smith's gag. Left hospital 21 days after operation.

Irruption of
molar.

iv. Hindu male, æt. 20. History of chancre and
pyalism; ulceration of cheek and gums, and cicatricial
contraction; could not separate teeth. Cicatricial bands
divided. Mouth kept open by occasional use of gag. Left
hospital in 34 days with the wound healed and able to open
his mouth fully.

Salivation.

v. Hindu male, æt. 5. Had suffered from cancrum
oris, which caused necrosis of the jaw and loss of several
teeth, and resulted in a firm cicatricial band on the inside
of the right cheek, which held the mouth firmly closed.
This was divided, a necrosed molar tooth removed, a bit of
necrosed alveolar process scraped away, and the mouth
forced open by a Smith's gag. The gag was used every
third day during the process of healing, and the patient
left hospital in 36 days, able to separate his teeth to a
sufficient extent.

Cancrum oris.

vi. Hindu male, æt. 12. Had suffered from malarious
fever, enlarged spleen, and cancrum oris two years before
admission. A firm cicatricial band resulted on the inside of
the left cheek, holding the teeth firmly and permanently in
contact. The same treatment was adopted as in the last
case. The wound healed in 39 days, and patient left
hospital with power to separate his teeth to a serviceable
extent.

vii. Mahomedan male, æt. 20. Jaws bound together by
cicatricial bands, due to destruction of buccal mucous mem-
brane by mercurial salivation. Bands divided by probe-
pointed bistoury, and mouth forced open by Smith's gag.
This was used periodically to maintain patency, and he was
discharged in 28 days, able to open his mouth fully.

Salivation.

viii. Hindu male, æt. 28. Similar case, but more aggra-
vated; alveolar processes necrosed and teeth loose. Three

Ditto.

CHAP. XVII. sequestra and teeth were removed after the bands had been divided. Patency was maintained by occasional insertion of a bivalve speculum. Left hospital in 21 days greatly improved.

X. 1.

Causes of
atresia oris.

Salivation.

Cancrum.

Irruption of
molars.

Gumboils.

Comment.—Cases of this sort are often met with in Lower Bengal, and as the condition prevents the eating of solid food, and materially impairs the faculty of speech, all sufferers are compelled to seek for relief. The two most common causes of this atresia are mercurial salivation and cancrum oris. Native quacks appear to be very fond of administering mercury for syphilis and fever, and they frequently push the drug until sloughing of the mucous membrane of the cheeks and gums, and sometimes necrosis of the alveolar processes and looseness or loss of the teeth, result. When the ulcers due to this destructive process heal, they pull the teeth, or gums if the teeth have fallen out, tightly together. Cicatricial bands of a very hard and unyielding kind extend from the upper to the lower jaw, and the finger cannot be inserted between the teeth or gums and the inside of the cheek. In cases of cancrum oris the destruction may be confined to the mucous and submucous textures, or may implicate the skin or bone. The cicatricial band in these cases may be less extensive—confined to one side of the mouth or one portion of the cheek. The effect as regards feeding and speech is the same. In a third class of cases the atresia is due to complications connected with the irruption of teeth—more particularly the wisdom teeth—when the jaw is contracted and the tooth grows into the cheek. The bands in these cases are situated further back, and the finger can be moved about freely in the cavity of the cheek. Sometimes atresia results from bad gumboils implicating the bone and causing alveolar necrosis. I have not met with any case of permanent closure of the mouth due to disease of the temporo-maxillary

articulation. Professor Heath, in his valuable treatise on "Injuries and Diseases of the Jaws," enters fully into this cause of closure of the mouth and its treatment (third edition, chap. xxvii.). He also devotes a most instructive chapter to the subject of closure of the jaws by intra-buccal cicatrices.

CHAP. XVII.

X. 2.

Heath on
closure of the
jaws.

In the foregoing cases the measures adopted consisted simply in thorough division of the cicatricial bands and the subsequent frequent use of a screw gag until cicatrization of the wound had been accomplished. The patients were retained in hospital as long as they could be induced to remain. None of them returned, and it is impossible to say how far the degree of improvement obtained in hospital was permanent. In one or two cases in which the cicatricial bands were narrow I made a V-shaped division of them, the apex of the triangle being situated at the fold of reflection of the mucous membrane of the gum on to the cheek. I observed also that, even when the incision was transverse, it became lozenge-shaped on dilatation of the mouth. When union of the sides of a wound of this kind takes place, considerable space is gained, and there is less tendency to reproduction of the contraction. Experience in Europe and America has, however, proved that simple incision, or even excision, of these cicatricial bands is of very little use unless followed by a very long and careful course of artificial dilatation.

Measures
adopted for
cure of atresia
oris.

2. FOR HARELIP.

Cases, 6 ; Deaths, 0.

- i. European boy, æt. 5. Single harelip, left side. The edges of the cleft were pared and brought together by a harelip pin. Discharged after ten days with partial obliteration of the cleft. He was operated on again with better success. (Dr. Palmer.)
- ii. iii. Both cases were single, without any palatal or dental complication ; edges pared and brought together by horse-hair. Result satisfactory.

Cases of hare-
lip.

CHAP. XVII.

X. 2, 3.
Operations for
harelip;

iv. Mahomedan female, æt. 7. Single, left side; incisor gum protruding through cleft. This was removed by cutting forceps, a giant incisor extracted, and the alveolar edge rounded off. The edges of the cleft were then pared and brought accurately together by six horse-hair stitches. A button suture was employed to take the strain off these. The wound healed by first intention, and a good result was obtained after nine days' treatment.

v. Hindu female, æt. 26. Single, left side, complete. A prominent incisor tooth was extracted, the edges of the fissure pared and brought together by seven horse-hair stitches. The wound healed by first intention. Patient was convalescing from an operation for the removal of labial elephantiasis when this operation was performed.

vi. Hindu male, æt. 7. Single, complete, fissure continuous with the cleft of the palate. (See case 4. ii. page 291.) Operation performed ten days after the staphyloraphy. Edges pared; ala freed; wound stitched by horse-hair. No dressing applied. Healed by first intention. Left hospital in ten days.

3. FOR RESTORATION OF LIP.

Cases, 2; Deaths, 0.

for restoration
of lip.

i. Hindu male, æt. 30. Had suffered from a carbuncular boil of lower lip four years ago; six teeth and a corresponding length of gum exposed. A flap was taken from the chin and transplanted upwards. This served to supply the deficiency, and conceal the teeth and gums. Remained 22 days in hospital.

Aggravated
case.

ii. Hindu female, æt. 13. Had suffered from sloughing parotitis two years before, which resulted in destruction of the whole of the left cheek, most of the lower lip, part of the upper, and most of the nose. Several teeth of both jaws necrosed; mouth permanently closed by firm cicatricial bands extending between the left alveolar processes. The unsound teeth were extracted, cicatricial material dissected off, and the mouth forced open; flaps were taken from beneath the lower jaw, and over the malar bone and zygoma to form a cheek and lips, and by a subsequent operation a new nose was formed, partly from the forehead and partly

from the right cheek. She was under treatment for 56 days, and left hospital with all the deficiencies in the face supplied, and able to masticate her food.

CHAP. XVII.
X. 4 5 6.

4. FOR CLEFT PALATE (STAPHYLORAPHY).

Cases, 2 ; Deaths, 0.

i. Eurasian male, æt. 19. Congenital fissure of soft palate in middle line. Tracheotomy performed, and chloroform administered through the tube. Pillars of fauces divided by scissors; deep incision made on each side of cleft to paralyse tensor palati; edges pared and brought together by horse-hair sutures. Stitches removed in six, seven, and eleven days: result satisfactory. Remained twenty days in hospital.

Cases of cleft
Palate.

ii. Hindu male, æt. 7. Fissure through both hard and soft palate. Edges pared; soft dissected off hard palate, latter divided on each side of cleft by chisel and hammer, and prized towards centre; pillars of fauces snipped across by scissors. Union took place except at two points, where small holes remained. The father would not permit a second operation.

5. Tongue-tie.—Hindu male, æt. 26. Congenital; tongue atrophied; articulation very defective; frænum divided by scissors and finger; movements of tongue rendered freer. Mastication facilitated; speech not improved.

6. For Vesico-vaginal Fistula.—Hindu female, æt. 20 (prostitute). Large aperture in anterior vaginal wall just behind meatus urinarius, the result of syphilitic ulceration. Condylomata on vulva. Urethra dilated, forefinger of left hand introduced into bladder. Anterior wall of vagina brought out into vulva in this manner. Edges of fistula pared. Silver and horse-hair stitches applied. Drainage tube inserted into bladder, and stitched with horse-hair to meatus. In ten days tubes and stitches removed; a small opening remained unclosed. This was pared and stitched again. In ten days stitches were removed. A small hole still remained. Patient refused to undergo further operation, and was discharged.

Vesico-vaginal
fistula.

7. Recto-vaginal Fistula.—East Indian female, æt. 32.

CHAP. XVII. Admitted with ulceration of rectum, external piles, and a
 X. 8. fistulous communication between the vagina and rectum,
 Case of recto- situated about half an inch from the anal verge, giving rise
 vaginal fistula. to very unpleasant suffering. She was in an advanced stage
 of phthisis and subject to diarrhoea. The fistula was laid
 open by division of the perinæum and the wound dressed
 with boracic ointment. This contributed to cleanliness and
 comfort. She died in a month of the phthisis and diarrhoea;
 the wound was clean and granulating.

8. FOR IMPERFORATE ANUS.

Cases, 3 ; Death, 1.

Cases of im-
 perforate anus.

i. Male child, five days old. Abdomen distended, parietes congested, intestinal coils visible, stercoraceous vomiting, difficult breathing; child very low. A puncture about a quarter inch deep in the centre of the perinæum. An incision was made in the middle line and gradually deepened to two inches. Meconium came through a trochar introduced for exploration. The bowel was freely opened, and the orifice pulled down and stitched by four horse-hair sutures to the skin of the anus. A large amount of fæculent matter escaped. The child was taken away by its parents, and the result of operation could not be ascertained.

ii. Male child, three days old. Same symptoms; depression about half an inch deep at the site of the anus; a little meconium passing by urethra. Similar operation performed. A large quantity of meconium was voided immediately after. The child sank in five hours.

iii. Male child, one and a half month old. Abdomen distended, covered with dilated veins, skin glazed. Penis and scrotum œdematous. Child emaciated. Vomited occasionally. Urine yellow and oily. Anal orifice existed, but probe could not be passed into the rectum, and no fæces came by anus. Similar operation performed, fæculent matter escaped at once, and the abdominal distension subsided. Was brought back for inspection three or four times. Made a good recovery.

Case iii. is a curious one. There must have been a fistulous communication between the rectum and

bladder, or urethra sufficient to keep the child alive, but insufficient to empty the bowel thoroughly. The practice of pulling down the end of the rectum and stitching it to the anal skin is an easy and useful one. Cases of imperforate anus are by no means uncommon in Bengal.

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X. 9.

9. FOR PHIMOSIS (CIRCUMCISION).

Cases, 21 ; Deaths, 0.

i. East Indian, æt 18. There was a history of gonorrhœa a month ago, and chancre two weeks afterwards. On admission a suppurating bubo was detected in the left groin. The prepuce was thickened, and phimosed and covered with warty growths. There was also purulent discharge from the urethra. He was circumcised under chloroform ; no stitches put in. The bubo was opened, and dressed with cotton and oil. He was discharged cured after 77 days.

Cases of circumcission.

ii. Native Christian, æt. 12 ; came in with congenital phimosis ; circumcised in the usual way. The prepuce was grasped between the blades of forceps, opposite to corona glandis, the glans pushed up, and the prepuce divided with curved bistoury in front of the forceps, the line of incision directed from above downwards, and slightly forwards. The mucous membrane was slit up and reflected, and then stitched to the surrounding skin with horse-hair at three points. Dressed with boracic gauze. Result very satisfactory. Left hospital in fifteen days.

iii. East Indian, æt. 13. Congenital ; prepuce removed, and adhesions to glans broken down. Result good.

iv. Hindu, æt. 24. Contracted chancre four months ago ; sores still on preputial meatus. Prepuce removed by slanting incision. Result good.

v. Hindu, æt. 18. Congenital ; retention ten days before admission. Prepuce contracted and adherent, removed obliquely ; thick fibrinous membrane found between inside of prepuce and glans ; mucous membrane slit on each side. Result satisfactory.

vi. Hindu, æt. 16. Sore on penis ; paraphimosis of six days' standing ; reduced ; circumcision performed three

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X. 9.

Cases of circumcison.

days afterwards; thickened prepuce removed. Result good.

vii. Hindu, æt. 30. History of gonorrhœa and chancre, purulent discharge existing, and sinus in right groin. Prepuce removed by circumcision, sinus slit. Discharged cured of both ailments in 30 days.

viii. East Indian, æt. 14. Chancroid sores round preputial orifice; phimosis. Prepuce removed; ulcers revealed on glans; they were touched with nitric acid. Stitches dragged; wound healed by granulation. Discharged in 34 days.

ix. Eurasian, æt. 20. A similar condition similarly treated. Healed by granulation in 30 days. Satisfactory result.

x. Eurasian, æt. 9. Congenital phimosis; collection of smegma in preputial cavity; balanitis and œdematous prepuce. Operation as in previous cases. Wound healed by granulation in nineteen days.

xi. Eurasian, æt. 18. Condition similar to cases viii. and ix.; similarly treated. Healed in 24 days.

xii. Similar condition; treated in the same way. Healed satisfactorily in 31 days.

xiii. Hindu male, æt. 28. Paraphimosis with phagedenic sores. Constriction divided, and prepuce, which was ulcerated, œdematous, and gangrenous, excised by scissors. Wound healed by granulation. Discharged in 24 days.

xiv. Burmese male, æt. 20. Preputial chancroid and phimosis of one and a half month's duration. Prepuce removed. Wound healed by granulation in 28 days.

xv. European male, æt. 21. Preputial chancroid and phimosis of two months' duration. Prepuce removed by circular incision, mucous membrane divided to corona glandis by two lateral incisions; edges of skin and mucous membrane brought together by horse-hair stitches. Parts healed in 29 days.

xvi. East Indian male, æt. 10. Congenital phimosis; same operation. Discharged in 30 days. Result good.

xvii. European male, æt. 30. Phimosis; same operation. Edges united by first intention. A small tumour was also successfully removed from the sole of the left foot. Detained 30 days in hospital.

xviii. Hindu male, æt. 20. Phimosis following gonorrhœa and balanitis. Excoriations round preputial orifice, penis much swollen. Same operation. Satisfactory result in fourteen days. CHAP. XVII.
X. 10, 11, 12.
Cases of circumcision.

xix. Hindu male, æt. 35. Elephantoid mass below glans, the result of paraphimosis three years ago. The whole of the prepuce was removed, and the skin of the penis united to the root of the glans by horse-hair stitches. Wound united by first intention in twelve days.

xx. East Indian male, æt. 17. Admitted with gonorrhœa, phimosis, and double suppurating bubo. Prepuce removed by oblique incision, mucous membrane slit up on each side, horse-hair stitches applied. Bubo laid open. Left hospital quite recovered in 59 days.

xxii. East Indian male, æt. 20. Orifice of prepuce contracted; syphilitic sore within; suffering from secondary eruption. Circumcision performed, and specific treatment resorted to. Discharged well in 24 days.

The operation performed in these cases is described in case ii. Latterly I have divided the mucous membrane on each side (case xv.) with satisfactory result. Remarks.

10. For **Epispadias**.—Hindu, æt. 15. Congenital. Plastic operation. Roof of urethra wanting to root of penis; mucous membrane dissected from sides of fissure and stitched on an india-rubber tube; skin freed on each side and brought to meet in middle line; lateral incisions made to relieve tension. Operation failed; stitches gave way and wound gaped. Sides healed by granulation, leaving the chasm a little smaller than it was originally. Discharged in 27 days. Failure.

11. For **Hypospadias**.—Hindu, æt. 21. Traumatic stricture, impermeable, near point of penis; fistula behind on lower aspect of penis. Plastic operation performed; failed. Patient would not retain tube, and urine got between lips of wound and caused its separation. Would not submit to second operation. Ditto.

12. For **Urinary Fistula**.—East Indian, æt. 34. Fistula consequent on stricture. Two plastic operations had been previously performed; fistula cauterized on two occasions. Bladder very irritable. Edges pared, small lateral flaps cut Ditto.

CHAP. XVII. and stitched together with catgut. Winged catheter inserted. Patient withdrew catheter; urine escaped through wound; primary union thus prevented. Healed by granulation, and contracted slightly. About $\frac{1}{4}$ th of the urine passed through the fistula. Left hospital 57 days after operation.

X. 13, 14.

13. FOR TALIPES VARUS.

Cases, 5; Deaths, 0.

Cases of club foot.

i. French female child, æt. 2. Both feet affected. Tendo Achillis and both tibiales divided subcutaneously. Deformity entirely corrected by the use of light block-tin shoes.

ii. Hindu male child, æt. 2 years 4 months. Congenital. Both feet affected. Tendo Achillis and both tibiales divided; bandaged to a straight splint on outside of foot. Deformity corrected.

iii. Twin brother of last case; both feet similarly operated on. False aneurism formed behind inner malleolus of right foot, laid open and artery (malleolar branch of posterior tibial) tied above and below. Wound healed up kindly.

iv. Hindu male child, one year old. Talipes varus of both feet, operated on as in previous cases. Deformity corrected to a great extent. Special boots recommended.

v. East Indian child, æt. 3. Foot quite inverted; walked on the outer malleolus and astragalus. Tendo Achillis, both tibials and flexor longus divided; position of foot partially rectified by splints and bandages. Left hospital in sixteen days greatly improved; supplied with a zinc shoe to be constantly worn.

14. FOR CICATRIX AFTER BURN.

Cases, 4; Death, 1.

Deformities caused by burn.

i. Hindu male, æt. 16. Right hand and forearm burnt severely twelve years ago; thumb bound to forearm by very tight cicatricial band, which was divided transversely. Wound stitched longitudinally. Recovered, with a hand greatly improved in appearance and usefulness.

ii. Hindu female, æt. two months, was burnt three hours

after birth in the left arm and hand. Elbow and wrist joint forcibly flexed and fixed by cicatricial bands. These were divided transversely, and the wounds thus made were stitched longitudinally. The deformity was rectified in this manner. The operation was performed antiseptically, and boracic dressings and a splint applied. On the second day there was a rise of temperature; the flaps showed indication of sloughing. On the third day there was high fever with tympanitis and vomiting, and death took place from exhaustion.

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X. 15.

Plastic operations for deformities caused by burn.

iii. Hindu male, æt. 7. Sustained a burn of the right upper extremity two a half years ago. This resulted in a triangular cicatricial web occupying the angle of the acutely flexed limb. The apex of the web was at the elbow-joint, and its base, measuring about $2\frac{1}{2}$ inches, extended from the wrist to the shoulder. The arm was covered externally with a thick (keloid) cicatricial mass. This was dissected off; the web was split up to the bend of the elbow. A band of skin was dissected off the inner and outer aspects of the limb above and below the joint, and united by sutures in the middle line. The limb was straightened and secured in that position by a straight splint. The wound gradually cicatrized, and patient was discharged, after 74 days' detention in hospital, with a useful limb.

iv. Mahomedan male, æt. 35. Right arm burnt in infancy. Cicatricial web prolonging folds of axilla, and binding arm to chest; another on the anterior aspect of the elbow-joint producing acute flexure and fixation. These were freely divided, and by careful dressing during the healing process the limb was restored to usefulness. Remained 70 days in hospital.

15. FOR CICATRICAL CONTRACTION AFTER OPERATION FOR SCROTAL ELEPHANTIASIS.

Cases, 3; Deaths, 0.

i. Hindu male, æt. 30. About a year ago was operated on for scrotal tumour in this hospital. Was discharged with a small ulcer at the junction of the penis with the scrotum. This cicatrizing, caused adhesion of the scrotum with almost

CHAP. XVII. the whole length of the penis. The cicatrix was divided
 X. 15, 16. under chloroform and under antiseptic precautions. The
 lips of the wound were stitched up from side to side. It
 healed without any formation of pus, and the patient was
 discharged after 28 days, perfectly satisfied with the result
 of the operation.

ii. East Indian, æt. 30. Scrotal tumour removed by
 operation on 10th September 1879; recovered in three
 months. Penis became gradually retracted and pulled
 down. Cicatricial band attaching the organ to the scrotum
 divided transversely, and incision stitched vertically. Opera-
 tion performed antiseptically. Wound remained sweet, and
 healed partly by granulation and partly by first intention.
 Discharged in 29 days. Penis quite free.

iii. Eurasian, æt. 43. Tumour removed in December
 1879. Retraction of penis took place during healing.
 Organ free to the extent of three-quarters of an inch.
 Operation as in last case; result satisfactory; left hospital
 in 50 days.

Decortication
 of testes.

16. Plastic Operation for Laceration of Scrotum.—
 Hindu male, æt. 25. His clothes were caught in an oil
 machine, and the skin of the penis and scrotum completely
 torn off, just as if he had been subjected to an operation for
 scrotal tumour. No bleeding; edges even; testes hanging
 free over perinæum. Pockets were dug for them as in the
 operation for scrotal tumour, the testes were stitched
 together by catgut, and lateral flaps of skin drawn over
 them by continuous catgut suture. An excellent scrotum
 resulted; the penis was gradually covered by cicatricial
 integument. Patient was discharged in 53 days.

CHAPTER XVIII.

NERVE STRETCHING AND SPLITTING.

1. HYDROCELE TAPPED AND INJECTED.

Cases, 11 ; Deaths, 0.

TINCTURE of iodine was used in all these cases, the quantity depending on the size of the tumour. In all, one injection sufficed to cure the disease. XV 1, 2, 3, 4-
Tapping and
injection of
hydrocele.

2. **Spina Bifida Tapped and Injected.**—Mahomedan male, one year old. Large fluid tumour over sacrum size of a foetal head, twelve inches in circumference; tapped with a hypodermic syringe and 3ss of Morton's iodo-glycerine solution injected. Refilled in a week. This was repeated eight times at intervals of seven to ten days, from 5 to 6 ozs. being evacuated on each occasion. Fever followed the first two operations. It was intended to increase the amount of fluid injected, but the parents grew impatient, and withdrew the child after 64 days' residence in hospital. The treatment did no good whatever. A large aperture could be discovered in the back of the sacrum when the tumour was emptied. Repeated
emptying and
injection of
spina bifida.

3. **Cystic Tumour of Neck Tapped.**—Hindu male, æt. 50. Fluid tumour on right side of neck, of ten years' duration. Experienced pain from pressure on the brachial plexus. Five ozs. of clear serous fluid were withdrawn by a small trochar, and the tumour collapsed. Patient left hospital the same day, and did not return.

4. NERVE-STRETCHING.

Cases, 6 ; Death, 1.

1. Hindu male, æt. 45. Tingling of left hand and arm six months before admission, succeeded by anæsthesia of ring and little fingers, and ulnar side of hand and forearm;

- CHAP. XVIII. wasting of muscles and bullæ. Ulnar nerve much thickened ; stretched above elbow. Sensation restored and muscular power improved. Discharged in 23 days. A full detail of this case is given in Appendix C.
- XI. 4. Ulnar nerve for leprosy.
- External popliteal nerve. ii. I. B., æt. 40, stationmaster. Foot crushed by a trolley some time ago. Numbness, tingling in three outer toes, and muscular weakness of whole foot. External popliteal nerve stretched. Left in sixteen days much relieved.
- Median for tetanus. iii. Hindu male, æt. 30. Right thumb smashed ; sloughed off ; tetanus supervened on 13th day. Median nerve stretched on 18th day. No benefit. Died on 24th day after injury—nine days after tetanus, and six days after nerve-stretching.
- Sciatic for leprosy. iv. Hindu female, æt. 40. Anæsthetic leprosy of six or seven years' duration. Right leg and foot affected ; gangrenous ulcers on toes. Sciatic nerve stretched. Wound healed in a week. Ulcers healed, and sensation restored to a slight extent.
- Sciatic for gangrene. v. Hindu, æt. 32. Admitted with gangrene of second, third and fourth toes of right foot, following tingling and numbness 40 days before ; whole foot much swollen. Sciatic nerve stretched below lower border of gluteus maximus. Wound healed under antiseptic treatment in two days ; swelling subsided quickly after the stretching ; line of demarcation formed, and parts were gradually separated, the wound closing up by granulation, leaving a serviceable foot. Remained in hospital 70 days.
- Sciatic for sciatica. vi. Patient an East Indian male, æt. 52. Had suffered for two years from sciatica, which had come on after exposure to cold, and had been treated in vain up-country by a great variety of medicines and appliances. He suffered constant agony, and was quite bed-ridden, being unable to move his leg without great pain. The sciatic nerve was exposed as it emerges from under the edge of the gluteus maximus, and thoroughly stretched. The wound healed by first intention, and the pain in the course of the sciatic nerve disappeared. No paralysis resulted from the operation. A tumour was subsequently detected above the great trochanter, which was judged to be a sarcoma. Patient would not consent to any operation for the removal of it, and left hospital greatly relieved after a stay of 48 days.

5. NERVE-SPLITTING.

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Cases, 3; Deaths, 0.

XI. 5.

i. East Indian male, æt. 17. Painful thickening of left ulnar nerve and tuberculated patch of anæsthetic skin on dorsum of wrist and lower part of forearm; commenced with itching of skin five years ago; fingers not affected. Similar patch over right tendo Achillis. General health good. Thickened nerve exposed above inner condyle, split to extent of four inches and pulled. Sheath found much thickened. Wound of nerve gaped. Operation performed antiseptically on 18th April; healed on 25th. No benefit. Musculo-spiral exposed above outer condyle and stretched on 28th. Wound healed by first intention. Operation followed by wrist drop, which gradually disappeared. No improvement as regards anæsthetic patch; would not have internal cutaneous stretched.

Ulnar and musculo-spiral for leprosy.

ii. Mahomedan, æt. 52. Two painful patches of thickened skin on wrist and ulnar side of left forearm. Disease of two months' duration. Ulnar nerve split for four inches above condyle and pulled. Sheath pearly in colour and thickened. Hyperæsthesia relieved; thickening of skin reduced somewhat. Wound healed in eleven days. Performed antiseptically. Catgut drain used.

Ulnar for leprosy.

iii. Hindu, æt. 29. Ulnar side of left forearm and little finger anæsthetic; skin thickened. Similar patch on left leg above outer malleolus. History of secondary syphilis six years ago. Disease of five months' duration. Became glazed, red and discoloured one month ago. Ulnar nerve above elbow much thickened. Nerve split and stretched for about five inches; sheath thick and pearly. Operation performed antiseptically; catgut drain used. Wound healed in twelve days. Thickening of skin gradually disappeared; sensation restored to a slight extent.

Comment.—In the year 1876, after witnessing the beneficial effect of nerve-stretching in sciatica and other nervous disorders, I wrote an article on the subject in the *Indian Medical Gazette*, and suggested that the operation might be beneficial in cases of anæsthetic

CHAP. XVIII. leprosy, in which the disorder was confined to the area of distribution of a particular nerve. Dr. Edward Lawrie, now Professor of Surgery in the Lahore Medical College, was at the time holding the office of resident surgeon in the Calcutta College Hospital. He took up the suggestion, and performed the operation in a large number of cases of anæsthetic leprosy implicating the ulnar nerve. The result appeared to be satisfactory. Sensation was restored and disorder of nutrition checked. He was able to examine two of the patients operated on several months after operation, and found that the benefit conferred was permanent and progressive (see the *Indian Medical Gazette* for September and October 1878). On my return to India and appointment to the Medical College, I had several opportunities of putting the practice to the test. Some of the cases in the foregoing series illustrate the operation and its results. Stretching was also resorted to in a case of tetanus (iii.), without benefit; of sciatica (vi.), with decided relief; of disordered innervation of the foot (ii.), with improvement; and of spontaneous gangrene (v.), with doubtful effect. The practice of stretching nerves for anæsthesia has been resorted to on a large scale by Dr. Downes, of the Kashmir Medical Mission, with satisfactory results; and Dr. Bomford, of the Indian Medical Service, has published some encouraging instances of the operations in the *Lancet* (vol. i. of 1881, p. 329).

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Lawrie's cases.

Dr. Downes' experience.

Other cases.

Two excellent cases, in which decided and permanent benefit was obtained from stretching the ulnar nerve, are recorded by Mr. James R. Wallace, officiating Resident Surgeon, Medical College Hospital, in the *Indian Medical Gazette* for November 1880. Assistant-Surgeon Mohrudra Nath Ohdedar has contributed another good case to the same journal for August 1882. He remarks: "I have performed the operation of nerve-stretching—ulnar and sciatic—seven times, but Ram Singh's case was the most successful one as

regards the result. In none of the cases except this one was the restoration of sensation so rapid and complete. In one case of sciatic nerve there was no appreciable improvement, but in the remaining five there was improvement more or less, and the unhealthy ulcers on the fingers and toes healed very rapidly. The operation of nerve-stretching is easy and devoid of any danger if performed with ordinary care, and one has only to perform it a few times to be convinced of its good effect. The result depends a great deal on the duration of the disease."

Dr. Brown-Sequard, in his interesting article on nerve-stretching in the latest edition of Holmes's "System of Surgery," remarks: "In none of the various affections in which nerve-stretching has been used is it called for so much as it is in that incurable, or almost incurable, affection, lepra anæsthetica." Guided by the experience afforded by the case related at length in Appendix D, I have latterly adopted the practice of splitting the affected nerve longitudinally in addition to stretching it. Three cases illustrative of the procedure are related above. The particular description of anæsthetic leprosy, in which stretching and splitting are most likely to be beneficial, is that in which the ulnar nerve and area are mainly or solely implicated. Cases of this kind are very common in Bengal, and the disease has been called ulnar neuritis. Doubts have been entertained as to whether the affection is really a kind of leprosy, but the fact that in many of the more advanced cases other cutaneous nerves are found to have undergone a similar change in lesser degree, seems to indicate that the disease is not a purely local one. In the early stages of this affection there are painful tingling and hyperæsthesia over the area of distribution of the nerve. The skin becomes hyperæmic, thickened, and dusky. In more advanced cases sensation is impaired, and herpetic or polyctenular eruptions appear over the anæsthetic area.

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Phenomena of
ulnar neuritis.

Pathology.

Paralysis and wasting of the muscles supplied by the nerve set in, the fourth and fifth fingers become permanently bent, and the hand loses power. In extreme cases anæsthesia and paralysis are complete, and ulcers form over the affected area. The ulnar nerve is felt in such cases to be thickened and hardened above the internal condyle. In the earlier stages the nerve is tender, and in the later callous. When exposed by dissection the nerve is found to be enlarged to twice or thrice its natural size, of a white, pearly colour, and extremely hard. On slitting it, the neurilemma is found to be greatly thickened, and the section gapes. The pathology of the change appears to be an infiltration of the sheath of the nerve by granulation cells, which undergo progressive transformation into cicatricial tissue. The nerve fibres are subjected to pressure, which first irritates and then benumbs them, and eventually atrophy and disorganization result from their strangulation. These changes have been carefully described and figured by Dr. Vandyke Carter in his admirable work on leprosy. If this view of the pathology of the disease is correct, more benefit is likely to result from splitting the nerve than from stretching it; but the evidence which has been recorded points to decided benefit being conferred in recent cases by the operation of stretching. An interesting case of this kind is related in full detail in Appendix C.

CHAPTER XIX.

DEATH-RATES AND CAUSES OF MORTALITY.

A GENERAL death-rate is a very vague measure of surgical success, because, unless statistics are prepared on a uniform plan, so as to include the same description of cases and present somewhat similar proportions of operations involving much risk to life, or the reverse, any comparison of them is fallacious, and any inferences drawn from such comparison meaningless. The inclusion or exclusion, for example, of operations on the eye in the tables contained in Appendix A makes a difference of as much as two per cent. in the death-rate in the case of the North-Western Provinces and Oudh. Similarly the exhibition of comparatively large numbers of amputations of hands, feet, fingers, and toes, very considerably reduces the mortality of amputation as a whole. Large entries of dislocations, abscesses, tapping, &c., exercise a similar influence on the general rate. Apart from this very obvious source of fallacy, however, differences occur under precisely similar circumstances when the hospital, the patients, the operator, and the system of treatment are the same, and the proportions of different kinds of cases very similar, which are very striking. These are mostly due to the paucity of the figures, and the brevity of the period over which they are spread. For example, the general death-rates shown in Chapter III. vary in different years from 9.9 to 18.9 per cent. of cases treated to the end, and this variation is observable in respect to particular classes of cases as well. Thus, in the year 1880, thirteen amputations were performed without a death, whereas in 1883

Causes of
differences in
death rates.

CHAP. XIX.

seven deaths took place among nineteen cases. The cause of difference was simply that in the latter year the cases operated on were of a more serious and critical kind. The death-rate of 14·7 per cent. which the combined figures of five years render would seem to be very unfavourable in comparison with the provincial rates shown in Appendix A; but a very superficial scrutiny of the tables will show that the data they contain are very unequal, and unequal in such manner as to depress the provincial rates.

Evidence of decreased mortality following operations in the College Hospital.

It is recorded in the Report on the Calcutta Hospitals submitted to the Bengal Government by the Committee of 1878, that Dr. W. J. Palmer found, as a result of compiling the figures of fourteen years, that the mortality following operations in the Calcutta Medical College Hospital was 22·8 per cent. If the data from which this conclusion was drawn were similar to those exhibited in Chapter III., the difference is very striking; but on this point I am unable to throw any light. The figures which I have recorded, supported as they are by details of cases, will serve for more accurate and satisfactory comparison with the future of the hospital than it is possible to institute with reference to its past. An analysis of the causes of mortality which these figures represent will still further promote this object.

Causes of mortality.

These causes are exhibited in the table on p. 307, which does not take account of a few cases which were removed from the hospital in a critical or moribund state.

I shall offer a few explanatory remarks regarding the principal entries shown in this table.

Shock.

1. *Shock, Prostration, and Collapse.*—Several distinct factors conspire to the production of death from shock and its congeners—principally, (1) constitutional debility, (2) previous disease, (3) previous injury, (4) loss of blood, and (5) the severity of the operation. In none of the cases included under this head is death referable to any one of these conditions by itself.

CHAP. XIX.

Table showing
the causes of
death after
operations.

CAUSES.	Numbers.	Percentages.
Shock, prostration and collapse	13	11.1
Exhaustion	20	16.9
Erysipelas	6	...
Septicæmia	15	...
Pyæmia	3	...
Osteomyelitis and pyæmia	1	...
Extravasation of urine	2	...
Total of septic causes ...	27	22.9
Gangrene	2	...
Spreading traumatic gangrene	3	...
Total of gangrene ...	5	4.2
Tetanus	15	12.7
Acute bronchitis	1	...
Pleurisy	3	...
Pneumonia	7	...
Total of inflammatory chest diseases ...	11	9.5
Diarrhœa	3	...
Dysentery	5	...
Total of bowel complaints ...	8	6.7
Peritonitis	7	5.9
Secondary hæmorrhage	5	4.2
Diphtheria	3	2.5
Dyspnœa	1	} 3.4
Chloroform asphyxia	1	
Hætic	1	
Phthisis	1	
Grand total ...	118	100

Commonly two are associated, and in some cases more than two. The operation in some cases was a very slight one—*c.g.*, reduction of compound dislocation of

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Remarks on
shock as a
cause of death.

the knee-joint, and stretching of the same joint for false ankylosis. In other cases the operation was one of extreme severity, as in the instances of removal of the upper extremity and scapula, and of the lower extremity and bones of the pelvis for large sarcomatous tumours; but even in these cases there was a very strong additional cause of death in the serious damage wrought in the constitution by the disease for which the operation was performed. Loss of blood is now, thanks to Esmarch, a less common and potent adjuvant of shock than it used to be. In only one case of shoulder amputation, when the cord slipped at a critical moment, could hæmorrhage be blamed for contributing to cause fatal shock. This element has, as far as operations are concerned, been almost eliminated from the category of shock-producers; but accidental hæmorrhage from injury must still remain, though the use of elastic cords, in military and railway practice more especially, is calculated to procure substantial benefit in cases of accident as well. I insert, as a footnote, references to the individual cases included under this head for convenience of further analysis.*

2. *Exhaustion*.—This is a very vague term, and it embraces a variety and complexity of death-causing circumstances which could not be better indicated by any other single word.

(1) The exhaustion may be due to excessive reaction, or unhealthy reaction and prostration with excitement; feeble constitution, bad health, loss of blood, and severe operation entering into the causation. There are five examples of this condition.

(2) The disease for which the operation was performed may run a fatal course, death being probably

* III. 2.

III. 3. c. x.

V. A. 1. i.

V. A. 15. ii.

V. B. 21.

V. B. 27.

VI. A. 2. b. i.

VI. A. 3. a.

VI. A. 3. d. iv.

VI. B. 2.

IX. 1. b. vii.

IX. 1. b. viii.

IX. 1. b. xv.

Conditions
embraced by
the term ex-
haustion.

precipitated by the latter. Of this class there are as many as ten cases. CHAP. XIX.

(3) Multiple injuries or loss of blood may impair the tolerance of operation. Of this there is one illustration.

(4) Hæmorrhage of a secondary kind may combine with diarrhœa, gangrene, &c., to cause a slow wasting of vital energy. There are three instances of this.

(5) Disease may supervene, or existing disease may become intensified after operation. In one case, for example, a combination of tubercular consumption, fever, and diarrhœa, conspired to produce fatal exhaustion. References to the cases included under exhaustion are given below.*

3. *Septic Causes*.—This category includes cases in which septic infection constituted the sole or main cause of death. In all the cases the development of the septic poisoning was associated with a putrid condition of the wound, and in several the onset of the disease coincided with a change from an aseptic to a septic condition. This was very clearly observed in two cases of liver abscess (ix. 14, xxiii., and xxvii.). In eight of the 27 cases the wound was in a putrid condition when the patient was admitted, and the state of septic infection had been already established. In twelve of the remaining nineteen, the wound was situated in localities where it is very difficult to maintain an aseptic state of wound; two were cases of labial elephantiasis, six of scrotal tumour, one for fistula in ano, one of tumour of the lower jaw, one of tracheotomy, and one of operation for hernia. Latterly I have succeeded better with such cases by using

Analysis of
deaths due to
septic infec-
tion.

* III. 5. b. i.	VI. A. 3. c. iii.	IX. 4.
V. A. 5.	VI. B. 1. b. xxi.	IX. 8. xiii.
V. B. 29. ii.	VI. B. 1. b. xlii.	IX. 8. xxii.
V. B. 29. iii.	VI. B. 1. b. xciv.	IX. 14. xcii.
V. B. 29. iv.	VI. B. 1. b. cvi.	X. 8. ii.
VI. A. 2. c.	VI. B. 7.	X. 8. iii.
VI. A. 3. d.	VI. B. 21. ix.	

CHAP. XIX.

Failure of
antiseptic
measures.

boracic lint more freely in immediate contact with the wound, and although I have not employed it, I believe, from what I have seen, that the sprinkling of iodoform on the raw surface is a very valuable expedient in this class of cases.

This leaves a balance of seven cases: in one of them strict antiseptic measures were not followed, and in the remaining six the antiseptic treatment was not carried out with sufficient caution and care. How many of these nineteen lives could have been saved by a more scrupulous application of antiseptics it is difficult to say, but I have no doubt that a still further abatement of mortality is possible through greater attention to the details of antiseptic management. Nothing can be clearer than that the life of the young man with the immense hæmatocele extending into his abdomen (case IX. 11. xv.) was sacrificed through the access of putrefaction into the immense cavity, full of putrescible material, which was laid open and exposed to septic influences. I have never seen a more rapidly developed and severe case of septic poisoning. Antiseptic measures were adopted, but they were quite inadequate. A list of references to the 27 cases are given below.*

In many of the cases secondary inflammations were observed, such as diarrhoea, dysentery, pneumonia, meningitis, peritonitis, and parotitis.

4. *Gangrene*.—In the cases which proved fatal through gangrene, the general health had been seriously

* <i>Erysipelas</i> .	VI. B. 1. b. cxxiii.	<i>Pyæmia</i> .
V. A. 4. ix.	VI. B. 1. b. cxxvi.	VI. A. 3. d. i.
VI. B. 1. b. xvii.	VI. B. 10.	IX. 8. ii.
VI. B. 1. c. i.	IX. 2. b. i.	IX. 14. lxxix.
VI. B. 1. c. ii.	IX. 3. viii.	
IX. 5. i.	IX. 11. xv.	<i>Osteomyelitis</i> .
IX. 14. xcix.	IX. 14. xxi.	III. 5. a. i.
	IX. 14. xxii.	
<i>Septicæmia</i> .	IX. 14. xxiii.	<i>Extravasation of</i>
VI. A. 1. v.	IX. 14. xxvii.	<i>Urine</i> .
VI. B. 1. b. cii.	IX. 14. xxx.	IX. 8. i.
VI. B. 1. b. cxvi.		IX. 8. xxviii.

compromised by pre-existing disease, the gangrene CHAP. XIX.
 supervening quickly on the injury or operation, and Gangrene.
 pursuing a very rapid course. *

5. *Tetanus* constitutes a formidable item in the bill Analysis of cases of tetanus.
 of mortality.' In one case the disease was in existence before operation, in another it supervened so rapidly that it was probably due to the preceding injury. In all the others, thirteen in number, it was undoubtedly due to the operation. It is very remarkable that out of these thirteen cases, nine were operations for the removal of scrotal tumours, and one was a case of herniotomy. Of the remaining three, two were amputations, and one a tumour of the thigh. The great liability of operations concerning the scrotum and testes to be followed by tetanus is shown by the general experience of the hospital. In the year 1880 I caused a return to be prepared of the mortality Statistics of previous years.
 following operations caused by this disease during the ten years 1870-79 inclusive: 402 deaths had occurred among 2,148 operations; and of these, 23, or 5·7, were due to tetanus; among these 23 cases, eight had occurred in scrotal cases. These figures probably understate the case, but they give general support to the very remarkable evidence furnished by the present return. During the same period 280 cases of tetanus were admitted into the hospital, of which 159 were of the idiopathic and 121 of the traumatic kind; 53 recoveries took place among the former, and 15 among the latter. (Vide *Indian Medical Gazette*, vol. xvi., 1881, p. 25.) These figures indicate how very common the disease is among the native community at large. Indeed, including trismus nascentium, which carries off a large number of infants in Calcutta within a few days of birth, about 10 per cent. of the total mortality of the town is due to tetanus. Trismus nascentium.

* VI. B. 1. b. cxxi.
 IX. 11. xvii.

V. A. 15.
 V. A. 17.

IX. 2. b. xxi.

CHAP. XIX.
Chronology of
tetanus.

Surgical
scarlatina.

The average interval which elapsed between the operation and appearance of the disease was nine days (extremes, five and fifteen), and the mean duration of the disease three and a-half days (extremes, eighteen hours and nine days). In only one case was the wound inflamed, and in two in a septic state. In all the rest the wound was aseptic and undergoing satisfactory repair. On the appearance of tetanic symptoms, repair is commonly interrupted, and destructive action may take its place. Several instances of recovery are related in these notes. Patients emaciate under the disease, and it takes many weeks before they lose pain and stiffness of their muscles and recover nervous vigour. I have also noticed in one or two cases a measly eruption during convalescence. This is quite different from the surgical scarlatina, of which I have also observed several instances. As scarlet fever is an extremely rare disease in India, it is quite certain that surgical erythema is a distinct malady from scarlatina. I have found it to be associated with putrid wounds, and look upon it as a form of septic blood-poisoning. Case IX. 11. xii. was a good example of the disease. The prevention of tetanus as a fatal complication in operative surgery is, in the present state of science, a difficult and hopeless question, and all the means of treatment, medical and surgical, hitherto tried, have not been attended with satisfactory result. The fatal cases of tetanus are indicated below.*

6. *Inflammatory Chest Diseases*.—Two of these deaths followed quickly on tracheotomy, and were probably due to already existing disease. A third followed a removal of sarcoma of the lower jaw, and may have been infective. In two cases fatal inflamma-

- | | | |
|-----------------------|-----------------------|-----------------------|
| * V. A. 7. | VI. B. 1. b. lxxxiii. | VI. B. 1. b. cxviii. |
| V. A. 9. | VI. B. 1. b. cvii. | VI. B. 1. b. cxxviii. |
| V. A. 37. | VI. B. 1. b. cviii. | VI. B. 8. b. |
| VI. B. 1. b. li. | VI. B. 1. b. cxi. | IX. 1. b. xiv. |
| VI. B. 1. b. lxxviii. | VI. B. 1. b. cxiii. | XI. 4. iii. |

tion of the chest followed the removal of the mamma and axillary glands, apparently illustrating the pathological sympathy between the surface and the sub-jacent organs; and two other cases of open angioma of the epigastrium and suppurative lymphangitis of the axilla point in the same direction.

CHAP. XIX.

Inflammatory chest diseases.

In the lithotomy case, the fatal disease, which supervened in 43 days, had no apparent connection with the operation. In the remaining cases the disease was probably due to cold caught during the susceptible period of convalescence. Chest disease of septic origin is illustrated by cases included under that head. It is worthy of note that in two of the cases symptoms of carbolic poisoning preceded the development of the fatal chest disease, and this was also observed in a case of operation for hernia removed in a moribund state (IX. 2. b. xii).*

Carbolic poisoning.

7. *Bowel Complaints*.—Diarrhoea and dysentery frequently constitute the final stage of fatal septic disease. This was probably the case in four of the present cases. In the other four the wounds were aseptic, and the causation of the disease obscure. Natives are very subject to severe and fatal bowel complaints, and the circumstance of their residing in hospital is no bar to contracting these. On the contrary, the vital exhaustion due to an operation and all its antecedents may reasonably be assumed to render them more prone to contract and succumb to them.†

Diarrhoea and dysentery.

8. *Peritonitis*.—In all these cases‡ the fatal disease

* IX. 3. vii.	VI. A. 1. vi.	VI. B. 19.
V. B. 36. ii.	VI. A. 3. b.	VIII. 3. xxviii.
VI. A. 1. i.	VI. B. 1. c.v.	IX. 3. vi.
VI. B. 1. b. xxxviii.	VI. B. 14. c.	
† VIII. 5.	VI. B. 1. b. xcv.	IX. 14. lxxv.
IX. 14. lix.	VIII. 3. vi.	IX. 14. lxxvii.
IX. 14. lxxxiii.	IX. 14. xxiv.	
‡ VIII. 3. viii.	IX. 1. b. x.	IX. 2. a. xiii.
IX. 1. b. iii.	IX. 1. b. xiii.	
IX. 1. b. vi.	IX. 1. b. xv.	

CHAP. XIX.

Peritonitis,

arose from local causes—in one from accidental perforation of the bladder, and in six cases of herniotomy from damage due to the strangulation of the bowel.

Secondary hæmorrhage.

9. *Secondary Hæmorrhage*.—In four of these cases this accident happened in putrid wounds. In the fifth the wound was aseptic, but the artery from which fatal hæmorrhage took place had been divided very close to the trunk, and no clot had formed in it on that account.*

Diphtheria.

10. *Diphtheria*.—These three cases† were admitted with the disease in an advanced stage; and were subjected to tracheotomy; but, though apparently relieved for the time, they eventually died of the diphtheria.

The other four causes, of which these are but single examples, are sufficiently explained in the notes of the cases.‡

* V. A. 14.

VI. A. 2. f. ii.

VI. B. 9. c. iii.

VI. A. 2. c. ii.

VI. B. 1. b. xiii.

† IX. 3. i.

IX. 3. iv.

IX. 3. xvi.

‡ IX. 3. ix.

VI. B. 13. a.

IX. 14. xlv.

X. 7.

CHAPTER XX.

HOSPITALISM AND ANTISEPTICS.

HOSPITALISM, as a term descriptive of septic disease, is misleading, inasmuch as it represents but one element in its causation—namely, the hygienic surroundings of the patient. Two other elements have to be taken into account—namely, the patient himself, his state of health and pathological proclivities, and the state and treatment of the wound. These three things—namely, the patient, the wound, and the hospital—enter into the etiology of every case and every kind of septic mischief; and of the three the wound is the most essential and important matter, next the constitution of the subject, and next the state of the hospital. The term is misleading from another point of view, inasmuch as it limits the prevalence of these diseases to hospitals; whereas it is quite certain that any and every kind of septic disease may originate and develop in private houses, where there is no aggregation of sick or wounded, and where the hygienic surroundings are to all appearance faultless. The Calcutta Medical College Hospital, as I have indicated in Chapter II., appeared at one time to be a hotbed of hospitalism, and Sir Joseph Fayrer's experience, as set forth in the works to which I have so frequently referred, gives ample evidence of the terrible mortality which was caused in his day by every form of septic disease. My own experience in 1874-75, when some measure of improvement had taken place, was painful and disheartening. The hospital appeared to be habitually infested with erysipelas, which it seemed impossible to

Factors of hospitalism.

CHAP. XX.

The *Senkne-*
scullah.

Hospitalism
originating at
home.

eradicate, and wounds went wrong and patients died in the most distressing way. Sloughing cellulitis phagedæna, and gangrene attacked a very large proportion of wounds; and erysipelas, septicæmia, pyæmia, diarrhœa and dysentery, and fevers and inflammations of low type attacked and carried off a very large number of patients. I well remember how often the services of a functionary called The *Senknewallah*—the fomenting-man—used to be called into requisition; he was an ill-looking, broken-nosed native, who carried about an earthen pot full of scalding water, and an assortment of pieces of old blanket. Sudden and sharp pains in chest or abdomen, or joints or limbs, preceded by rigor and attended with pyrexia, indicating the onset of a pleurisy or a peritonitis, or of rapid formation of matter in joints and fasciæ, called for his frequent ministrations; and too often the services of the *dome*—the functionary who removes the dead—had to be sought instead. The office of *Senknewallah* has now, I am thankful to say, become a sinecure in the surgical wards, and the *dome's* attendance is less frequently required. But even in these days the hospital was too exclusively blamed. It was not sufficiently realized that the average patient was a wretched being, of feeble vital resistance, prone to suppurative inflammation and gangrene, and a most apt subject for the reception and development of septic infection; nor was it fully ascertained that in a large proportion of cases the very worst forms of septic disease had been hatched in him, and had attained full maturity, before he entered the wards of the hospital. Dr. McConnell showed in 1878, that of 62 cases of fatal septic disease which reached the hospital deadhouse, 41 had been admitted into hospital with the disease in an advanced stage. I have myself seen hospitalism in every phase in the persons of native patients who had never entered a hospital, and during the five years covered by these records I have seen patients with

open wounds and abscesses, cases of crushed and lacerated limbs, compound fracture, extravasation of urine, &c., admitted into hospital with constitutional septic disease established and in full and fatal degree. In these cases a feeble constitution, unhealthy dwelling, and putrid wound conspired to produce the complication. But it is quite certain that if the one element of this threefold causation had been eliminated—namely, the putrid wound—if the case had been Listerised from the first, the other two elements would not have sufficed, either separately or in conjunction, to produce the septic disease. I have never seen septic disease of any sort arise in a patient whose wound was in an aseptic condition, and, on the other hand, in those cases in which I have had the misfortune to witness the development of constitutional septic disturbance, this has always been preceded or accompanied by manifest signs of local putridity, and unmistakable evidence of those derangements of the reparative process which in susceptible persons and unfavourable circumstances closely follow on the putrefaction of the wound. The details which have been given in preceding chapters amply sustain this conclusion, and there is no difficulty in appreciating these local changes, for the phenomena of aseptic repair differ fundamentally and entirely, more especially in bad subjects and bad hospitals, from those which characterize septic repair. In the case of good subjects and good hospitals the difference may not be so apparent. A subject whose general and tissue vitality are high, and who is carefully nursed in a well-ventilated hospital ward, may without antiseptics recover from severe wounds and abscesses with very little or no local or constitutional disturbance; but it is otherwise when the material to be dealt with is, so to speak, inflammable, and the surroundings apt to fan the septic spark. It is for these reasons that I would place the wound first among the factors of septic

Fundamental distinction between septic and aseptic repair.

CHAP. XX.

Difficulties in
securing aseptic
occlusion in
India.

disease ; and apart from its being a portal of septic infection ; it is manifest that its asepticity also saves the hospital atmosphere from contamination, and conserves the constitutional vigour of the patient by eliminating the element of local and constitutional pathological disturbance. I have therefore striven during these five years to realize those objects which Lister has proved to be of such importance in dealing with breaches of surface of all kinds, whether the result of disease, accident, or operation. But the practice of antiseptic surgery is attended with difficulties in India which are not experienced in England. Careless and heedless assistants, unintelligent and reckless patients, and difficulties in obtaining the necessary appliances, render failures more frequent than they ought to be. I have not been able to follow Lister's directions in full detail, and my best efforts have often been thwarted and spoiled by want of intelligent co-operation, insufficiency of dressings, and so forth ; but I have convinced myself, nevertheless, that Listerism constitutes a new departure in surgery, which it is incumbent upon every surgeon to imitate and perfect according to his means and opportunities, and it will be my earnest and constant aim and endeavour, when I resume my labours in Calcutta, to carry out the details of antiseptic surgery to the utmost of my ability, feeling assured that if I succeed in so doing better than I have done, my results will also be better than those exhibited in this record.

APPENDIX A.

RETURN OF SURGICAL OPERATIONS PERFORMED IN THE
HOSPITALS AND DISPENSARIES OF BENGAL, THE NORTH-
WESTERN PROVINCES AND OUDH, AND THE PUNJAB,
DURING THE YEARS 1878-1882.

THESE returns have been compiled from the official reports annually submitted to the Governments of the several provinces. They cannot be accepted as absolutely accurate, and the different methods of tabulation followed in different provinces render compilation on a uniform plan difficult. Still, the figures are useful as exhibiting the kind and amount of work done in the Government hospitals and dispensaries, and they also give useful information regarding the comparative frequency of the several descriptions of operations, and of the diseases for which they were performed, as well as the mortality consequent upon particular operations. Frequent reference has been made to them in the preceding pages.

Return of Surgical Operations performed in the Hospitals and Dispensaries of Bengal, the North-Western Provinces and Oudh, and the Punjab, during the Years 1878-1882.

DESCRIPTION OF OPERATION.	Bengal.			N. W. Provinces and Oudh.			Punjab (4 years 1879-1882).		
	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.
I.—OPERATIONS ON THE EYE AND ITS APPENDAGES.									
1. For entropion ...	...	...	...	...	...	...	42	...	...
2. For trichiasis ...	...	...	...	...	...	...	54	...	...
3. For strabismus ...	...	...	...	...	...	...	33	...	...
4. For pterygium ...	...	...	...	...	...	...	19	...	...
5. For lachrymal obstruction ...	...	...	...	...	...	...	20	...	...
6. Artificial pupil ...	18	...	...	...	...	...	178	...	...
7. Iridectomy ...	43	...	...	...	...	...	6	...	...
8. Solution of the lens ...	9	...	...	...	...	...	27	...	...
9. Depression of the lens ...	18	...	...	...	...	...	...	...	...
10. Extraction of the lens ...	609	1	16	13,724	1	007	1108	...	...
11. Extraction of opaque capsule ...	1	...	...	...	...	...	...	...	...
12. Extraction of foreign bodies ...	127	...	...	...	...	...	37	...	...
13. Puncture of the globe ...	14	...	...	...	...	...	3	...	...
14. For staphyloma ...	32	...	...	...	...	...	36	...	...
15. Incision of cornea ...	4	...	...	...	...	...	...	...	...
16. Sclerotomy ...	1	...	...	...	...	...	...	...	...
17. Excision of the eyeball ...	70	2	28	...	...	...	41	...	...
18. Removal of tumours from the neighbourhood of the eye...	15	1	66	...	...	...	...	...	...
Total ...	961	4	4	...	...	...	1612	...	...

II.—OPERATIONS ON ARTERIES AND VEINS.

1. Ligation of arteries ...
2. Acupressure " ...
3. Obliteration of varicose veins

Total ...

III.—OPERATIONS ON JOINTS.

1. Reduction of dislocations ...
2. Extension of stiff and deformed joints ...
3. Incision of joints ...
4. Excision of joints ...

Total ...

IV.—OPERATIONS ON BONES.

1. Sequestrectomy...
2. Excision of bones

Total ...

V.—AMPUTATIONS.

1. Shoulder-joint...
2. Arm ...
3. Elbow-joint ...
4. Forearm ...
5. Wrist-joint ...
6. Hand in whole or part
7. Hip-joint ...
8. Thigh ...

42	4	9'5	48	3	6'2	54	2	3'7
1	1	100	...	...	...	...	...	...
2	1	50	...	...	...	1	...	...
45	6	12'8	...	...	...	55	2	3'6
1931	1	'05	2293	9	'4	2219	8	'36
63	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...
16	...	...	94	8	8'5	59	1	1'7
2017	1	'04	...	...	...	2278	9	'39
284	6	2'1	...	...	...	192	2	1'0
181	10	5'5	...	...	...	112	3	2'6
465	16	3'4	...	...	...	304	5	1'6
12	5	41'6	28	10	35'7	12	3	25
117	32	27'3	187	38	20'3	83	7	8'4
1	1	100	131	16	12'2	9	...	...
99	18	18'1	...	...	...	87	9	10'3
13	1	7'7	...	...	...	7	...	...
307	7	2'2	...	...	...	109	1	'9
1	1	100	...	...	...	8	4	50
62	33	53'2	117	49	4'9	31	11	35'5

DESCRIPTION OF OPERATION.	Bengal.			N.W. Provinces and Oudh.			Punjab (4 years 1879-1882).		
	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.
AMPUTATIONS—(continued).									
9. Knee-joint	18	7	38·8	...	...	...	9	3	33·3
10. Leg	135	43	31·8	187	51	27·2	167	40	23·9
11. Ankle-joint	3	...	...	...	...	...	2	...	...
12. Foot in whole or part	136	10	7·3	67	8	11·9	99	7	7
13. Penis	103	4	3·8	...	...	...	40	4	10
Total	1007	162	16	...	...	...	663	89	13·4
Total excluding hand, foot, and penis	461	141	30·6	650	154	23·7	415	77	18·5
VI.—REMOVAL OF TUMOURS.									
1. Cancerous tumours	157	6	3·8	2543	59	2·5	147	5	3·3
2. Other tumours	1102	14	1·2		...	...	1087	14	1·3
3. Elephantiasis of the scrotum	155	6	3·9		...	...	1	...	...
4. Elephantiasis of the female genitals	31	1	3·2	...	...	...	...	...	...
5. Internal piles	37	...	...	214	...	...	133	...	...
Total	1482	27	1·8	...	...	..	1368	19	1·4
VII.—REMOVAL OF FOREIGN BODIES.									
Extraction of bullets	302	1	·3	...	...	...	197	...	...
Total ... ..	...	...	...	...	...	...	32	4	12·5
Total ... ..	...	...	...	...	...	...	229	4	1·8

VIII.—REMOVAL OF CALCULI.							
	19	..	..	..	..	..	..
1. Urethral	19	..	..	..	..	..	..
2. Vesical ...	993	96	9'6	{ 4320 117 }	388 11	3719 41	468 3
a. By lithotomy							
b. By lithotripsy							
c. By dilatation of female urethra .. .. .				..	..	71	3
Total ..	1012	96	9'5	4437	399	3831	474
IX.—INCISIONS.							
1. Neurotomy .. .. .	..	..	..	..	..	20	1
2. Laryngotomy	2	..	..	..	..	3	2
3. Tracheotomy	6	2	33'3	..	..	17	7
4. Gastrotomy	1	1	100	..	..	..	..
5. Abdominal section	1	..	..	..	..	..	..
6. Operations for hernia...	76	15	19'7	100	22	55	11
7. For artificial anus	39	3	7'7	..	..	9	3
8. For impervious anus .. .. .	..	..	1	..	..	16	2
9. Splenotomy .. .. .	..	..	..	..	..	1	1
10. For fistula in ano	2	..	..	..	..	..	..
11. Urethrotomy	54	1	1'8	..	..	71	..
12. Perineal section	61	13	21'3	..	..	25	2
13. For extravasation of urine	2	..	..	..	..	..	..
14. For fistula .. .. .	..	..	..	..	..	216	..
15. For sinuses	10	..	..	..	..	1	1
16. Ovariectomy .. .. .	..	..	..	..	..	..	..
17. For suppurating goitre	1	1	100	..	..	..	..
18. Tenotomy and myotomy	17	..	..	..	..	28	1
19. For large abscesses	2616	70	2'6	..	..	464	14
Total ..	2888	106	3'7	..	..	926	45

DESCRIPTION OF OPERATION.	Bengal.			N. W. Provinces and Cadh.			Punjab (4 years 1879-1882).		
	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.	Number of operations.	Deaths.	Percentage of deaths.
X.—REPARATIVE OPERATIONS.									
1. For cicatrices ...	160	...	...	...	...	...	43	1	2'3
2. For abdominal fistula...	4	...	...	...	...	...	...	...	...
3. For urinary fistula ...	11	...	...	...	...	...	...	...	...
4. For perineal rupture...	8	1	12'5	...	...	...	...	...	...
5. For recto-vaginal fistula	5	...	...	...	...	...	...	...	...
6. For vesico-vaginal fistula	3	...	...	...	...	...	5	1	20
7. For protrusion of intestines and omentum ...	11	4	36'3	...	...	...	3	2	66'6
8. For prolapsus of the uterus ...	...	...	...	...	...	...	3	...	...
9. For hernia testis ...	10	1	10	...	...	...	2	...	...
10. For scrotal fistula ...	1	...	...	...	...	...	...	...	...
11. For imperforate vagina	1	...	...	...	...	...	...	...	...
12. For atresia oris ...	1	...	...	...	...	...	...	...	...
13. For harelip ...	39	...	...	135	...	...	87	...	...
14. Rhinoplasty ...	5	1	20	...	...	...	4	...	...
15. For conjoined fingers ..	2	...	...	...	...	...	...	...	...
16. For phimosis ...	...	...	...	...	...	...	...	...	...
Total ...	261	7	2'7	...	...	...	148	4	2'7
XI.—OPERATIONS NOT CLASSED.									
1. Paracentesis of abdomen and thorax ...	1234	115	9'3	...	...	...	1074	110	10'3
2. " of hydrocele ...	...	...	...	...	...	...	158	1	'6

APPENDIX B.

A CASE OF REDUCIBLE DIRECT RIGHT INGUINAL HERNIA OPERATED ON BY LIGATURE OF THE NECK AND REMOVAL OF THE BODY OF THE SAC; DISSECTION OF THE PARTS SEVEN AND A HALF MONTHS AFTER OPE- RATION.

(From the *Indian Medical Gazette*.)

A. JACKMAN, a European sailor, aged 48 years, was admitted into the first surgeon's ward with a reducible inguinal hernia of the right side on the 7th January 1882.

Previous History.—The patient had been suffering from hernia for the last eighteen years: it first came on suddenly, after an attack of coughing, with a peculiar sensation of something having given way. For about a month the tumour was of the size of a pigeon's egg, and he took no notice of it for twelve months, after which, it became larger and more painful, when he was obliged to wear a truss, which proved to be useful in keeping back the protruding gut and removing the pain. He had been continually wearing the truss for seventeen years, after which time from long exercise or the sudden impulse of coughing, the hernia became very painful, and he took his admission into the first surgeon's ward on the 27th December 1880, and underwent Wood's operation for radical cure on the 2nd January 1881. The wound suppurated in the track of the wires, which were taken out eleven days after the operation, and two drainage tubes, each one inch long, were inserted. The wound healed in twenty-two days; the inguinal canal was found to be contracted, hardly admitting the tip of the forefinger, and a new truss was given to the patient for additional safety, but in spite of it he had a descent of the hernia again on the 1st April. He left hospital on the 14th May, and was advised to come back in the next winter for another operation.

Condition on Admission.—The inguinal ring of the right side admitted the tips of three fingers; there was no thicken-

ing of the cord; the scrotum of natural size; the hernial tumour was of the size of a duck's egg; it did not come down when the patient lay on his back, but only when he stood up or sat.

Operation.—On the 11th a modified Wood's operation was performed under chloroform and strict antiseptics. An incision three inches long was made over the external ring along the cord, and the subjacent fasciæ divided and the sac exposed; it was tied close to the ring and cut off. The pillars were brought together by two catgut stitches, and the ends were left long for drainage. The wound was stitched and dressed.

Progress.—The wound was aseptic throughout, and healed by the first intention; the wire stitches were removed on the 16th, and the horse-hairs on the 19th; a small sinus was left in the track of the drain, which came away on the 21st; fungous granulations sprouted through the sinus, and were snipped three times and kept down by application of caustics. He was discharged in 118 days. The wound had completely healed, and a linear depressed cicatrix was left. There was consolidation of tissue around, and the ring was closed and united to the cord. No impulse was felt on coughing below the cicatrix; the canal was practically closed.

He returned to hospital in August 1882 suffering from typhlitis and rectal dysentery. He was repeatedly examined during life, and the cure of the rupture was found to be complete. He died of sloughing dysentery on the 24th of August; that is to say, seven and a half months after the date of the second operation. His body was examined three hours after death, and the right inguinal canal was removed and subsequently dissected with great care.

Nothing noteworthy was found in the cranial cavity. There were old adhesions of right pleura, and the inferior lobe of the right lung was somewhat carnified. There was slight thickening of the valves and endocardium on the left side.

Abdomen.—Little or no fluid in the peritoneum. Recent adhesions between cæcum and peritoneum covering right iliac fossa; a layer of omentum intervening. Three entire intussusceptions of small intestine easily disengaged; congested, but not inflamed. Sloughing perforating ulcer in cæcum sealed by omentum. Small sloughing ulcers in ascending colon. Rectum in a state of sloughy ulceration. Slough defined by sharp cut irregular margins at brim of pelvis and

anus. *Liver* weighed 5 lbs. 11 ozs. Large abscess in centre of right lobe; four other smaller abscesses in the same lobe. *Spleen* somewhat enlarged; capsule thickened. *Kidneys* granular; cortical substance atrophied. *Bladder* contracted; coats thickened; mucous membrane inflamed and thrown into ridges; exudation on these.

A special dissection was made of the parts which had been the seat of operation. The plan of dissection consisted in stripping the tissues off the conjoined tendon layer by layer from without and within, and studying the different layers as they were raised. Commencing from without, a linear cicatrix was found in the right groin about three inches long, extending obliquely downwards and forwards from about half an inch above the middle of Poupart's ligament, terminating about an inch from the root of the penis. On invaginating the skin of the scrotum the external ring was found to be closed; it would not admit the point of the finger. The description of the dissected parts can best be gathered from the following notes, which were dictated as the dissection proceeded:—

"The skin and superficial fascia are easily stripped off the surface of the external oblique aponeurosis, as far as the middle of the cutaneous cicatrix, where strong cicatricial bands are encountered. Weaker cicatricial bands unite the whole length of the cicatrix to the surface of the aponeurosis; the cicatricial bands are evident all along the course of the cord, as far down as the apex of the testicle, the tunica of which is distended with about two drachms of fluid. The external ring is not capable of accurate definition owing to cicatricial adhesions; on stripping the aponeurosis of the external oblique off the internal oblique, it is found that when the cord is approached the two are adherent by cicatricial bands which have to be divided by the knife; the conjoined tendon and internal pillar are thus inseparably united together, and are brought into intimate adhesion with the cicatricial tissue lying beneath the peritoneal depression; so close is this union, that the fibres have to be divided with the knife. The superficial ring is in point of fact obliterated and closed.

"The edge of the conjoined tendon is found to be closely adherent by cicatricial bands to the surface of the cord; on dissecting the cord from below upwards the cremasteric fascia can be easily separated from the surrounding cellular tissue as far as the external ring, where it is closely adherent to the surrounding tendinous structures by means of cicatricial

bands; so firm is this adhesion that on making traction above or below (from within or without), the cord cannot be pulled into or out of the canal to any extent; the adhesion is less marked inferiorly; and beneath the cord the finger can be carried to some extent towards the internal ring, as far in fact as opposite to the peritoneal depression, which is now felt to be tough and fibrous. On dividing the spermatic fascia it can be easily stripped off the inner surface of the cremasteric as far as the conjoined tendon, where it becomes closely adherent; the finger can now be carried a little further along the cord, but as this passes beneath the conjoined tendon, further progress is absolutely stopped.

"Turning now to the peritoneal aspect of the groin, there is a depression at the inner ring, oval, about the size of a bean, smooth-edged internally, shelved externally, with a pit at the internal and inferior angle; the peritoneum is transparent except in the immediate neighbourhood of the depression. The peritoneum strips off easily, except at the situation of the depression, where it is very firmly adherent by cicatricial tissue, so adherent that in stripping it off the membrane is torn; it is now found that the deep epigastric artery lies outside of the depression; the elements of the cord are seen external to it; on making traction upon the cord the depression is rendered deeper; on endeavouring to pull the cord out of its canal, it is found to be adherent by cicatricial bands to all the surrounding structures, more especially to the depression already described; the epigastric artery lying loose in the mass of fat between the cord externally and the peritoneal funnel internally; on raising the artery the fibrous adhesion between the cord and funnel is made very apparent.

"The conjoined tendon arches closely over the cord; and all the tendinous structures in the locality—the tendon of the rectus muscle, the conjoined tendon, Poupart's ligament and the external and internal pillars—are found to be intimately adherent to each other, and to the outer surface of the cord by means of cicatricial bands."

The hernia was a direct one, and it is quite certain that the operation had succeeded in curing it radically.

The drawings made by Baboo Hurish Chunder Kur give an admirable representation of the appearance of the internal ring before any dissection was made, and of the condition and relations of parts after the peritoneum had been stripped off and the underlying structures somewhat defined. They are reproduced in Plate III.

APPENDIX C.

CASE OF ANÆSTHETIC LEPROSY TREATED BY NERVE-STRETCHING.

(From Notes by Assistant-Surgeon NITAI CHURN HALDAR.)

MATHOOR MOHUN CHATTERJEE, a thinly-built Bengali Brahmin, aged 45 years, a resident of Diamond Harbour, shopkeeper by occupation, sought relief on the 13th May 1879 for anæsthesia of the left forearm and hand.

History.—The patient states that about six months ago he felt a tingling sensation over the back of the middle finger near the knuckle. Ten days after this he had fever of an intermittent type. With the increase of the fever the peculiar sensation gradually extended over three inner fingers, the greater part of the hand and forearm, and also over the lower part of the arm. At the same time he had well-marked pain above the elbow-joint on the inner side, which radiated down the forearm. After two months the tingling gave place to complete insensibility, which commenced in the hand and gradually extended upwards. He then noticed a thick round cord along the lower part of the inner side of the arm, and the limb became thin and wasted. Pustular eruptions or blebs appeared over the anæsthetic area, which burst of themselves, and, healing, resulted in cicatrices.

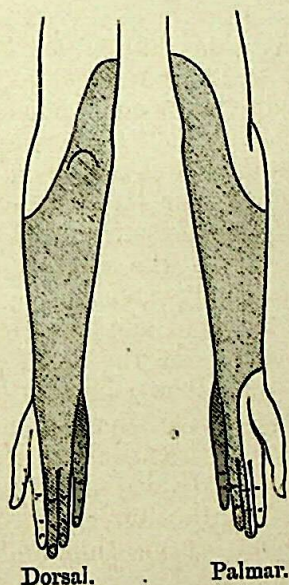
About six months ago he also noticed two small patches of skin of the size of a rupee over the dorsum of the right hand and over the left cheek, which were devoid of sensibility. No history of syphilis or injury.

Present condition.—Body poorly nourished; tongue furred; pulse regular and fairly strong. Bowels irregular: no splenic or hepatic enlargement: no pulmonary complication.

The anæsthetic area on the left hand occupied exactly the

inner half of its palmar aspect—*i.e.*, a line drawn from the middle of the wrist along the mesial plane of the middle finger marks off the inner anæsthetic portion and the outer sensible portion. The whole of the flexor aspect of the lower two-thirds of the forearm and the inner half of its upper third, and a portion of the lower half of the arm, are similarly affected.

The dorsal aspect of the three inner fingers, the greater part of that of the hand (a small space adjacent to the unaffected thumb and forefingers excepted), the whole of the dorsal aspect of the lower two-thirds of the forearm and inner half of its upper third, and a small portion of the lower half of the arm, are also quite devoid of sensation. This is better shown in the following rough outline sketch:—



The parts shaded are without sensibility.

The ulnar nerve can be distinctly felt, and is found, for a distance of four inches above the inner condyle, to be considerably thickened; on pressing it the patient feels pain. The muscles of the little finger are atrophied, and those of the thumb partially so. The skin of the affected parts is marked with scars. The fingers are kept in a flexed condition; the power of moving them is impaired.

Three days after his admission—on the 18th of May—the patient was put under chloroform, and an incision about two inches in length was made along the course of the ulnar nerve in the lower part of the arm. The nerve was very much thickened and indurated: it was separated and drawn out of the wound, then forcibly pulled upwards and downwards and forwards. Three vessels were ligatured with catgut. A few cords of catgut were put into the wound for drainage. The edges were brought together by four horse-hair stitches. This was done under thorough antiseptic precautions.

There was no rise of temperature in the evening.

Next day there was slight sanious discharge from the wound. In the evening the temperature rose to 101.2° : no change in the sensibility of the parts.

On the 20th there was slight sensibility in the forearm and hand. Temp. 100° . The inner aspect of the arm and the upper part of the forearm were somewhat swollen and oedematous. Vomited several times.

On the 21st, the patient could feel in almost every part of the forearm and hand, except over little finger and a narrow strip of skin in continuation of it up to the wrist on both aspects of the hand, which remained completely anæsthetic (this part has been shaded more deeply in the sketch). The temperature was 98° in the morning. The swelling increased, and it was soft, oedematous and resembled a recent elephantoid swelling in nature. The lymphatic glands of the axilla became swollen and painful. Dressings not changed. In the evening his temperature was 99° F.

On the 22nd the morning temperature was 99.2° . He could now feel with the little finger and adjacent parts, but could not distinguish two points placed an inch apart over them. In other parts the sensibility was almost perfect. The swelling of the forearm had extended downwards; pain in the glands about the same; no fluctuation. Evening temperature, 99.2° . Bowels open. Appetite good. Tongue rather furred. Pulse slow and steady. Dressings not changed.

Next day the dressings were changed. There was a slight collection of lympho-pus; the catgut ligatures were absorbed, so a small drainage tube was inserted. Pain and swelling in the arm, forearm, and axilla were less. In the evening the temperature rose to 100.2° .

On the 24th there was slight discharge, the swelling in

the forearm had somewhat increased, but there was no heat nor redness. Complained of severe pain in the axilla, which was somewhat hard to the feel. Evening temperature, 99.4° .

On the 25th no change in the sensibility of parts. Glands of the axilla very painful and hard; no fluctuation could be detected there. In the evening the temperature rose to 101.2° F.

Next day, evening temperature was 101.2° . Pain in the arm and axilla worse. Pulse rather frequent: appetite dull.

On the 27th a subcutaneous abscess was found to have formed rather in front of the original wound and communicated with it, so a large drainage tube was put into it through the old opening, and the wound was dressed as usual. Evening temperature, 101.2° . No suppuration in the forearm or axilla.

On the 28th he had no fever: there was a slight collection of matter. The swelling of the forearm had subsided very much, while that of the axilla had increased in hardness. Discharge from the cavity not free. On the 29th the abscess was found to have discharged its contents through a small opening, which was enlarged and a drainage tube inserted. Swelling of the forearm decreasing rapidly and pain in the axilla about the same. Temperature normal in the morning, and 99.8° in the evening.

After this the cavities continued to discharge freely and contract. The forearm resumed its normal shape within a short time. The glands of the axilla continued to increase in size, and at one time threatened to suppurate, but he had no more fever.

On the 5th June the drainage tubes were taken out. No fluctuation could be detected in the upper part of the arm and axilla.

On the 8th the original wound was quite linear and the abscess healed up almost entirely.

The glands of the axilla were found to be decreasing in size.

On the 10th June the patient was discharged; sensibility was almost perfect in every part of the limb except in the little finger and adjacent parts, where it was somewhat dull: he could not distinguish two points placed at a distance of an inch from each other over these parts. The fingers were not kept in a fixed position, and they were moved with greater ease and freedom; the horse-hair stitches were removed. A

linear cicatrix marked the position of the wound: the ulnar nerve was smaller and less prominent. There was slight hardening in front of the elbow. The forearm was of normal size. Some induration of the upper arm and axilla remained, but there was no pain or fluctuation. Antiseptic dressings were employed throughout, and no putrefaction occurred at any time either in the wound or abscess. The matter which was discharged from the abscess was of a thin viscid lymph description.

Remarks.—The facts of this case may be thoroughly relied on. The patient was a particularly intelligent man, took an acute interest in his own case, and gave information regarding the presence, absence, or modification of sensation in a prompt, clear, and decided manner. The case was undoubtedly an early stage of anæsthetic leprosy. The existence of three distinct areas of absolute anæsthesia, two of them manifesting the erythematous skin eruption, and the third the phlyctenular, places this beyond doubt. The nutrition of the skin and muscles of the left forearm and hand had become impaired, as well as sensation, some contraction of the fingers had taken place, but no shrinking or ulceration. The anæsthesia was profound. The area of anæsthesia was somewhat peculiar. It corresponded to the distribution of the internal cutaneous nerve, the lesser internal cutaneous, and the ulnar; but the last-named nerve apparently supplied a greater number of fingers than usual. The cutaneous branches of the median, radial, external cutaneous and musculo-spiral were unaffected, and the skin on the radial side of the forearm and hand had not undergone any change. The short muscles of the thumb were only partially atrophied, while those of the little finger were entirely so. Painful as well as tactile impressions were abolished over the affected area. Heat was not applied. The ulnar nerve was hard, thickened, and painful to pressure.

The "stretching" was very thoroughly done and in every direction. Sensation was not restored for about 48 hours after the operation, and then not over the entire area; but of its restoration there was no doubt whatever. Four days after the operation the insensitive area was found sensitive, but this latter restoration was and remained incomplete.

The attack of lymphangitis, which commenced on the second day after the operation, caused tense œdema of the forearm, a lymphatic abscess of the arm and great swelling

of the axillary glands was a curious feature of the case. It was not of septic causation, for the discharges remained perfectly sweet throughout and the wound healed by adhesion. The man insisted on leaving hospital within the month, and it has been impossible to ascertain whether the restoration of sensibility has been permanent, as it is difficult to predict whether such will be the case.

APPENDIX D.

CASE OF NERVE-SPLITTING.

(From *Brain*, April 1880.)

C. R., æt. 26, a spare East Indian, of nervous temperament, consulted me on the 27th of December regarding a wasting of the left forearm and hand, and numbness of the latter, from which he had suffered for eight years, and for which he had been subjected to various plans of treatment, without gaining relief from any. In the year 1871 he began to experience peculiar sensations in the little finger and ulnar side of the left hand. The parts gradually got numb, the muscles of the hand wasted, and the fingers became permanently bent. He sought relief at the Presidency General Hospital, when it was discovered that the ulnar nerve had undergone thickening. Blisters were applied along the course of the nerve, and subsequently iodine and magnetic electricity, but no benefit was derived from these energetic remedies. An abscess formed in 1875 above the elbow on the inner side, which discharged spontaneously, and left a sinus, which continued to emit matter for some time, and then closed of itself. This sinus reopened in 1879, without apparently any fresh accession of inflammation. His condition when I examined him was as follows:—

Left arm generally less muscular than the right; circumference of left forearm one inch less than right. Special wasting over position of flexor carpi ulnaris. Hand very much wasted, more particularly the short muscles of the little finger, the interossei, and the abductor pollicis. The short muscles of the thumb are smaller in bulk than on the

opposite side. The fingers are habitually bent, more especially the ring and little fingers, which are permanently flexed at both phalangeal joints. The thumb can be straightened completely, the fore and middle fingers almost completely, the ring and little fingers very partially, the first phalangeal joint remaining bent at a right angle. The action of the common extensors and flexors is unimpaired. The power of adduction and abduction of the fingers is almost abolished. The thumb can be adducted and abducted. Sensation is abolished all over the little finger, and over its metacarpal bone on the dorsal and palmar aspect as far as the styloid process of the ulna. Sensation on the ulnar side of the ring-finger is diminished, and on the radial side perfect. Sensation over the ulnar two-thirds of the dorsum of the hand (as far as the line of the metacarpal bone of the middle finger) is very much impaired. On the palmar side sensibility extends as far as the metacarpal bone of the ring-finger. The degree of sensibility was tested by pricking with a pin, and the patient, who is a very intelligent young man, gave very prompt and definite indications of the sensations experienced.

The skin of the insensible area is somewhat congested, but there is no vesication or breach of surface. There is a hard knot on the dorsal branch of the radial nerve about three inches above the wrist. There is a similar knot on the great auricular nerve of the left side as it crosses the sterno-cleido-mastoid muscle, and on the frontal nerve of the right side. All these knots are painful on pressure. The ulnar nerve is very much thickened behind and above the elbow to the extent of about five inches. It is hard and cartilaginous to the feel, as thick as the middle finger, and painful on manipulation. There is an orifice of a sinus over the course of the nerve situated about four inches above the inner condyle of the humerus.

I advised the patient to submit to the operation of stretching the ulnar nerve as the only expedient likely to benefit him, and gained his ready consent.

Operation.—After bringing him under the full influence of chloroform, and washing the parts thoroughly with carbolic lotion, I passed a director into the sinus, and found that it passed into the interior of the nerve as far as the level of the inner condyle. I slit the sinus up throughout its whole extent. A long linear incision, exposing the nerve for a space

of four inches, was the result. It was hollowed out by an abscess, of which its thickened texture constituted the wall. This cavity was filled with curdy material, and stuff of the same kind escaped on pressure from orifices in the abscess wall. These orifices led to small chambers or recesses in the mass of the thickened nerve. The cavity was thoroughly emptied, and the contents of the flask-shaped recesses squeezed out. The lining membrane of the main cavity was then scraped off, and the smaller cavities carefully cleaned out with a small scoop. The nerve was then split in two from before backwards, and the division was prolonged into the comparatively sound nerve above and below, the knife following as far as possible the direction of the fibres. The continuation of the nerve behind the condyle was somewhat thickened, and contained a few cells full of yellow curdy material. The operation was performed under strict antiseptic precautions, and the whole line of wound was very carefully brought together by iron wire and horse-hair stitches, after a few threads of carbolized catgut had been laid in it for drainage. Boracic-acid ointment, spread on muslin, was applied next the wound, and the ordinary carbolic gauze dressing placed so as to reach to the axilla above and half-way down the forearm below. The dressing was removed every second or third day, according to circumstances. Convalescence was satisfactory. An attack of ague occurred during the second day, which yielded to quinine. The neighbourhood of the wound was intensely sensitive for the first ten days or so. The wound remained sweet and healed kindly. The following notes were taken on the 21st of January, 1880—24 days after the performance of the operation:—

“Cicatrix completely healed. No abnormal sensibility in the neighbourhood of the wound. The thickened nerve is still perceptible beneath the cicatrix, but it is not so hard or bulky as before the operation. There is no evidence of deep matter or sinus. Above the cicatrix the nerve is slightly thickened and very sensitive; below the cicatrix the nerve is also somewhat thickened and sensitive, but less so than above. The flexor carpi ulnaris is still atrophied. He straightens his little and ring fingers rather better, and separates his fingers with more force and effect. The muscles of the hand are still very much wasted, and the tendons very prominent. There is still slight congestion of the dorsal surface of the ungual phalanx of the little finger. Painful sensation is elicited by the prick of a pin all over the hand, except over a narrow

strip on the dorsum of the little finger, as far as within half an inch of the styloid process. Pinching with the finger and thumb, however, produces pain up to the first phalangeal joint; beyond that there is no sensation, or perception of pricking or pinching, but when the end of the finger is forcibly squeezed, pain is caused."

Remarks.—The condition for which the operation above described was resorted to is, as far as my experience goes, a very rare one. I have frequently seen thickened nerves leading to anæsthesia and impaired motility over the area supplied by them; but I have never before seen a nerve hollowed out in this fashion by an abscess, and the seat of curdy deposits. In this patient three nerves were the subject of thickening, and two of them of abscess and sinus. The ulnar nerve appears to be specially liable to this thickening. Dr. Lawrie, acting on a suggestion which I threw out in 1876, stretched this nerve in thirty cases in which thickening and anæsthesia existed (*Indian Medical Gazette*, vol. xiii, pp. 229, 270), and in all of which the operation produced benefit. In two cases, regarding which he has been able to obtain information, marked and permanent improvement was experienced; and in a similar case, which I reported at length in the August (1879) number of the same journal, restoration of sensibility and power followed very speedily upon the stretching of the thickened nerve. In the present instance stretching was not resorted to—simply laying open and splitting the nerve; and although the patient did not recover sensibility or muscular power fully, the notes of the condition before and after the operation leave no doubt that very considerable amelioration was caused by the operation in both respects. How the operation of mechanical stretching restores the function of the nerve I am not prepared to say. The case now recorded would render it probable that amendment is produced by removing tension and pressure upon the nerve fibrils. The case is also interesting in demonstrating the function of the interossei and lumbricales muscles in extending the two terminal phalanges. Their tendons join the extensor aponeurosis on the dorsal surface of these phalanges. There was no impairment of power of the common or special extensors, but the paralysis of the interossei and lumbricales caused permanent flexion of all the fingers, and when the function of the ulnar nerve was partially restored, the fingers could be better straightened.

NOTE.—Patient was again seen on 19th March 1881, when the following notes were taken:—Sensation of ulnar area entirely restored. Muscles bulky and more powerful. Hand stronger. Ring and little fingers still bent, but not so much. Cicatrix free from tenderness. Ulnar nerve thinner and softer. No abnormal tenderness on manipulating it.

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